Biological Evaluation

Support for NPDES 301(h)-Modified Permit for Asplund Water Pollution Control Facility

Prepared for
Anchorage Water and Wastewater Utility

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Jacobs

EC049

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Executive Summary

Background

This Biological Evaluation (BE) has been prepared pursuant to Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended, (16 *United States Code* [U.S.C.] Section 1531 et seq.), to evaluate potential effects of the United States Environmental Protection Agency's (EPA's) reissuance of a National Pollutant Discharge Elimination System (NPDES) permit with Section 301(h) modifications for the continued operation of the City of Anchorage Water and Wastewater Utility (AWWU) John M. Asplund Water Pollution Control Facility (AWPCF) in Anchorage, Alaska. The proposed action is EPA's reissuance of the NPDES permit with Section 301(h) modifications under the Clean Water Act (CWA) (33 U.S.C. Section 1251 et seq.).

AWWU, as the applicant, has prepared this BE to analyze potential effects of the continued operation of the AWPCF on ESA-listed and candidate species and designated critical habitats within the action area that are under the jurisdiction of the National Marine Fisheries Service (NMFS). Federally listed species within the action area include Cook Inlet beluga whales (*Delphinapterus leucas)* and the Western Distinct Population Segment (DPS) of Steller sea lions (*Eumetopias jubatus)*. Humpback whales (*Megaptera novaeangliae*), fin whales (*Balaenoptera physalus*), and sunflower sea stars (*Pycnopodia helianthoides*) (a candidate species) are considered infrequent or rare in the action area; however, they are included in this BE to provide a comprehensive evaluation (refer to **Table ES-1**).

The conclusions described in this BE result from a significant effort of data collection, analysis, and literature review that concludes **no contaminants detected in the AWPCF effluent are likely to pose risk** to the ESA-listed species and their prey species. Within the framework of ESA Section 7, the results indicate that discharge from the AWPCF outfall ***may affect but are not likely to adversely affect*** Cook Inlet beluga whales or the Western DPS of Steller sea lions. AWWU has demonstrated a 40-year history of successfully operating the AWPCF to meet NPDES water quality requirements. Detailed modeling was completed to better understand the dilution, fate and transport of the effluent close to the discharge point into Turnagain Arm. More than 830 literature sources were reviewed and, of those, more than 465 sources were integrated into the analysis presented herein, including AWPCF monitoring reports, scientific literature, and site-specific studies. The best available scientific information on the upper Cook Inlet biological community was used as the basis for evaluating current conditions and whether the water quality "assures the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife…" as specified in the Criteria and Standards for the NPDES (40 *Code of Federal Regulations* [CFR] Part 125 Subpart G Section 125.62). All of this work supported a comprehensive ecological risk evaluation using site-specific data combined with a robust toxicology process completed to evaluate exposure and potential risks to ESA-listed species and their designated critical habitat.

The assessment framework follows the NMFS Alaska Region Technical Guidance on ESA consultation[1] and a weight of evidence (WOE) approach following the general framework established in *2016 EPA Weight of Evidence in Ecological Risk Assessment* (EPA 2016b) to evaluate overall risk of ESA species that could be exposed to AWPCF discharge. This WOE framework provides a mechanism to present multiple lines of evidence collectively to provide increased confidence in the decision-making process regarding potential exposure and risk to ESA-listed marine mammals and their prey species from AWPCF effluent.

[1] https://www.fisheries.noaa.gov/insight/endangered-species-act-section-7-alaska-region; Accessed March 2025.

The WOE framework has three main steps: assemble the evidence, weigh the evidence with respect to properties, and evaluate the integrated body of evidence. The categories of evidence are described in Table ES-2 and summarized in the following subsections.

Project Description

The project description is an important category of evidence because it describes the entire wastewater system from how AWWU regulates the influent coming into the plant through the treatment system, through the outfall designed for optimal dilution to a detailed modeling effort to understand how the discharge is transported into the discharge water body.

The pretreatment program, treatment system, and outfall were designed for minimal impact to the discharge body of the water. AWWU implemented its Pretreatment and Non-Industrial Source Control Program in April 1982 to control and reduce potentially toxic discharges into the AWPCF. The AWPCF provides primary treatment designed to remove the settleable and suspended solids from entering the discharge water body. It is currently operating at a significantly lower capacity than its design. The outfall was originally designed and located for optimal mixing of the discharge into Cook Inlet off Point Woronzof.

The annual monitoring program, designed specifically for this site to confirm the AWPCF is working as designed, confirms AWPCF consistently meets the water quality limits. The treatment facility is required to develop and implement a program to monitor the impact of the approved discharge on receiving waters and potentially exposed marine biota as part of its NPDES permit requirements. To meet this requirement, AWWU has implemented an extensive monitoring program since 1985 (Kinnetic Laboratories Inc. 1987).

The required annual monitoring program includes treatment plant influent/effluent sampling, sewage sludge management procedures, water quality monitoring, biological and toxicological monitoring, and a toxics control program (Kinnetic Environmental Inc. 2023a, 2024a). AWWU monitors for toxic pollutants and pesticides, which includes more than 130 pollutants such as asbestos, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), metals, and cyanide. For the period 1987 through 2024, AWWU's annual monitoring reports are published on its website.

Additional effluent samples were collected in 2010 and 2023 to obtain measured concentrations of contaminants of emerging concern (CECs) in AWPCF effluent. Seven classes of CECs (pharmaceuticals and personal care products, sterols/hormones, pesticides, polybrominated diphenyl ethers [PBDEs], per- and polyfluoroalkyl substances [PFAS], nonylphenols, bisphenols, and 6-PPD quinone) were sampled to support the NPDES renewal application.

A three-dimensional hydrodynamic and transport model was developed for the upper Cook Inlet to predict mixing and transport, including nearfield plume dilution and farfield circulation of effluent-derived water column and sediment constituents. This model was used to help define the proposed Zone of Initial Dilution (ZID) boundary as well as to predict the dilution factors used in the ecological risk assessment.

Action Area

The action area for this permit is defined as a 350-meter radial distance from the AWPCF outfall at Point Woronzof, as defined by the updated ZID proposed to EPA. The intent of the ZID is to encompass the area within which effluent constituents are mixing with waters in Cook Inlet. The ZID proposed to EPA is smaller than the current ZID because the model shows AWPCF can achieve its water quality limits within this smaller area.

Environmental Baseline

The environmental baseline describes the current physical, chemical, and biological conditions in the action area; describes potential sources of contaminants to the action area; and discusses potential effects from climate change on ambient conditions.

ESA-Listed Species

Cook Inlet provides habitat for beluga whales, Steller Sea lions, and their prey species. The action area is highly scoured from tides and currents; therefore, it presents limited habitat in comparison to other highly productive areas of Cook Inlet. The action area does not sustain major foraging opportunities for prey fish or marine mammals. Aerial survey and land- and vessel-based monitoring data suggest Cook Inlet beluga whales transit through the area off Point Woronzof and do not actively feed there for any notable period of time. Rather, belugas are known to spend most of their time near river mouths such as the Susitna Delta and other areas where foraging opportunities are high.

Potential Effects of the Action

This category provide a comprehensive analysis and evaluation of much of the data collected for the BE; therefore, represents the most significant category in the analysis. It includes an evaluation of the monitoring program results, an ecological risk analysis, a discussion of the cumulative effects, and a literature review of potential toxicity of AWPCF effluent to prey fish and ESA-listed species.

Monitoring Program Results

AWPCF discharge has met water quality monitoring permit requirements since its inception. AWWU has performed the required monitoring and consistently met the water quality limits.

Ecological Risk Evaluation

The ecological risk evaluation provides a quantitative evaluation of the potential exposure and risk to Cook Inlet beluga whales, Steller sea lions, and their prey species, which were evaluated for detected concentrations in effluent measured at the end of pipe as well as within four exposure areas that encompass critical habitat for the Cook Inlet beluga whale: the edge of the ZID; Knik Arm; upper Cook Inlet; and Turnagain Arm. Species-specific exposure factors, including the amount of time beluga whales or Steller sea lions could be exposed to a contaminant in each exposure area, were considered.

The potential for risk was estimated using exposure point concentrations, migration factors for the receptors and toxicity values. Data sources for the risk evaluation included measured concentrations of regulated and unregulated pollutants and CECs obtained from direct concentration measurements in AWPCF effluent. Effluent was characterized by sampling 250 potential contaminants, including those required to maintain the NPDES permit and CECs.

Five exposure areas were assessed to estimate potential risk to beluga whales and their prey:

- End of Pipe – The end of the pipe was the only exposure area evaluated in the preliminary screening. This represents the point source of effluent in the three openings of the diffuser and is of negligible surface area (0.8 square meter). The end of the outfall pipe does not represent an area with viable habitat or a realistic exposure area for the identified receptors. End-of-pipe risk was used only in the preliminary screening phase of the evaluation to identify chemicals to be further evaluated in the refined assessment.

- Edge of the ZID – The edge of the ZID is the area encompassed by a 350-meter radial distance from the outfall (0.257 square kilometers [km^2])
- Knik Arm – Knik Arm is an extension of Cook Inlet branching north of Anchorage with a coverage of 278 km^2.
- Mid Upper Cook Inlet – The area of the mid upper Cook Inlet is bounded by the openings into both Knik and Turnagain arms and extending out into the main Cook Inlet channel. Areal coverage is approximately 590 km^2.
- Turnagain Arm – Turnagain Arm is an extension of Cook Inlet branching south of Anchorage with a coverage of 700 km^2.

Dilution factors were determined using the hydrodynamic and transport model.

A robust process for toxicity benchmark selection was used to ensure accurate results. To evaluate potential toxic effects to Cook Inlet beluga whale and Western DPS Steller sea lion prey species, chronic no-effect marine surface water toxicity values for aquatic organisms were selected from the following sources:

- Alaska Site-Specific Water Quality Criteria (SSWQC) – Aquatic life criteria for marine water in Cook Inlet (ADEC 2025). These criteria were cited for analytes that have unique water quality standards that are not based on the national criteria. If the National Recommended Water Quality Criteria (NRWQC) were the basis for the SSWQC, the NRWQC are cited. If the NRWQC are more conservative than the SSWQC, the NRWQC were used.
- Alaska State Water Quality Standards (AWQS) – Aquatic life for marine water (ADEC 2022). These criteria were cited for analytes that have unique water quality standards that are not based on the national criteria. If the NRWQC were the basis for the AWQS, the NRWQC are cited.
- National Recommended Water Quality Criteria (NRWQC) – Marine criteria chronic concentrations (CCC) (EPA 2024a). NRWQC are cited for chemicals for which Alaska uses the federal values.
- Ecological screening values for PFAS from Argonne National Laboratory (2024).
- No-Effect and Low-Effect Benchmarks (BMs) from Los Alamos National Laboratory (LANL) (2022).
- EPA Region 4 marine acute and chronic screening BMs (2018).

When toxicity values from these sources were not available, BMs were selected from peer-reviewed toxicology studies. Peer-reviewed literature was identified primarily through EPA's Ecotox database (EPA 2024c). When more than one toxicity study was available for a specific chemical, a prioritization scheme was used to select the most representative study. Because fish comprise the dominant mass portion of the beluga and Steller sea lion diets in Cook Inlet, this assessment selected toxicological studies demonstrating dose-effect relationships in marine fish species. When a suitable study using marine fish was not available, toxicity studies for freshwater fish or for invertebrates were considered.

Cumulative Effects

Several activities were identified that are reasonably certain to occur within the action area. Municipal sewage is expected to remain unchanged from current conditions. Noise and climate change are expected to continue in the future. Local infrastructure and transportation, urban sources, oil and gas production and fisheries have been identified but future effects are uncertain.

Toxicity Review

An expanded review of literature regarding potential effects of chemical contaminants on prey species and ESA-listed species (where available) was completed to provide additional support for the conclusions drawn from the review of annual monitoring results and the ecological evaluation.

Conclusion

As summarized in **Table ES-1**, the proposed action ***may affect, but is not likely to adversely affect***, Cook Inlet beluga whales. The action area occurs within designated critical habitat for Cook Inlet beluga whales, but the proposed action is not expected to adversely affect any of the critical habitat primary biological features described in **Section 5.1**. The proposed action ***may affect, but is not likely to adversely affect***, Steller sea lions and there is no designated critical habitat for this species within the action area or upper Cook Inlet.

The proposed action ***will not affect*** humpback (Mexico/North Pacific stock) and fin whales, or sunflower sea stars (a candidate species) because these species are either infrequent or are not expected to occur in the action area near Point Woronzof and exposure to AWPCF discharge is not anticipated. The proposed action will not occur in critical habitat for any of these species. Designated critical habitat for the Mexico/North Pacific stock of humpback whales does not overlap with the action area in Cook Inlet and critical habitat has not been designated for fin whales.

The proposed action is not expected to cause the incidental "take" of any ESA-listed species.

Table ES-1. ESA-Listed and ESA Candidate Species, Status, Designated Critical Habitat, and Effects Determinations

Common Name	Stock or DPS	Scientific Name	ESA Status	Determination of Effect	Designated Critical Habitat in Action Area?	Adverse Effect on Critical Habitat?
Beluga Whale[a]	Cook Inlet	*Delphinapterus leucas*	Endangered	May Affect, Not Likely to Adversely Affect	Yes	No
Steller Sea Lion[a]	Western DPS	*Eumetopias jubatus*	Endangered	May Affect, Not Likely to Adversely Affect	No	No
Humpback Whale[a]	Mexico N. Pacific Stock	*Megaptera novaeangliae*	Threatened	No Effect; not expected in action area	No	No
Fin Whale[a]	Northeast Pacific Stock	*Balaenoptera physalus*	Endangered	No Effect; not expected in action area	Not Designated	Not Designated
Sunflower Sea Star[a]	N/A[b]	*Pycnopodia helianthoides*	Candidate	No Effect; not expected in action area	Not Designated	Not Designated

[a] Managed under NMFS jurisdiction.

[b] N/A = Sunflower sea stars are a candidate species; stocks or a DPS have not been identified.

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Acronyms and Abbreviations

°C.....degree(s) Celsius

µg/kg.....microgram(s) per kilogram

µg/L .....micrograms per liter

µPA.....microPascal(s)

AAC.....Alaska Administrative Code

ADEC.....Alaska Department of Environmental Conservation

ADF&G .....Alaska Department of Fish and Game

ADNR.....Alaska Department of Natural Resources

AFSC .....Alaska Fisheries Science Center

AIA.....Ted Stevens Anchorage International Airport

APDES.....Alaska Pollution Discharge Elimination System

AWPCF .....John M. Asplund Water Pollution Control Facility

AWQS .....Alaska Water Quality Standards

AWWU .....City of Anchorage Water and Wastewater Utility

BE.....Biological Evaluation

BiOp .....Biological Opinion

bls .....barrel(s)

BOD.....biochemical oxygen demand

BOEM.....Bureau of Ocean Energy Management

BTEX .....benzene, ethylbenzene, toluene, and total xylenes

CCC.....criterion chronic concentration

CEC.....contaminant of emerging concern

CFR.....Code of Federal Regulations

CID.....critical initial dilution

CMC.....criterion maximum concentration

CWA.....Clean Water Act

DDT .....Dichlorodiphenyltrichloroethane

DF.....dilution factor

DMR ..... Discharge Monitoring Report

DO ..... dissolved oxygen

DPS ..... Distinct Population Segment

EEZ ..... Exclusive Economic Zone

EFDC ..... Environmental Fluid Dynamics Code model

EFH ..... essential fish habitat

ENP ..... Eastern North Pacific

EPA ..... United States Environmental Protection Agency

EPC ..... exposure point concentration

EPOC ..... emerging pollutants of concern (also referred to as a contaminant of emerging concern [CEC])

ESA ..... Endangered Species Act

ESI ..... electrospray ionization

ESU ..... evolutionarily significant unit

FC ..... fecal coliform

FC/100 ml ..... fecal coliform colonies per 100 milliliters

FL ..... fork length

FMP ..... Fishery Management Plan

FMU ..... fishery management unit

FR ..... Federal Register

GLG ..... growth layer group

HAPC ..... habitat area of particular concern

HBCD ..... hexabromocyclododecane

HCB ..... hexachlorbenzene

HCH ..... hexachlorcyclohexane

HQ ..... Hazard Quotient

Hz ..... hertz

JBER ..... Joint Base Elmendorf-Richardson

kHz ..... kilohertz

km^2 ..... square kilometer(s)

m/sec ..... meter(s) per second

m^2 ..... square meter(s)

m^3/sec ..... cubic meter(s) per second

MAEC ..... maximum allowable effluent concentration

mcf ..... million cubic feet

MDL ..... method detection limit

mg/kg ..... milligram(s) per kilogram

mg/L ..... milligram(s) per liter

mgd ..... million gallons per day

mg-N/L ..... milligram(s) of nitrogen per liter

MHHW ..... mean higher high water

MLLW ..... mean lower low water

MMPA ..... Marine Mammal Protection Act

MOA ..... Municipality of Anchorage

MRL ..... method reporting limit

MSA ..... Magnuson–Stevens Fishery Conservation and Management Act

MZR ..... Mixing Zone Regulations

NAWQA ..... National Water Quality Assessment Program

ND ..... Not detected

ng/kg ..... nanogram(s) per kilogram

ng/L ..... nanogram(s) per liter

NMFS ..... National Marine Fisheries Service

NOAA ..... National Oceanic and Atmospheric Administration

NOAEL ..... no observed adverse effect level

NP/NPE ..... Nonylphenol and nonylphenol ethoxylate

NPDES ..... National Pollutant Discharge Elimination System

NPFMC ..... North Pacific Fishery Management Council

NR ..... not reported

NRWQC ..... National Recommended Water Quality Criteria

NTU ..... nephelometric turbidity unit

OSP..... optimum sustainable population

PAH ..... polycyclic aromatic hydrocarbon

PBDE..... polybrominated diphenyl ethers

PBF ..... physical or biological feature

PBR..... Potential Biological Removal

PCB..... polychlorinated biphenyl

PCDD ..... polychlorinated dibenzodioxin

PCDF..... polychlorinated dibenzofuran

PFAS..... per- and polyfluoroalkyl substances

PFOA..... perfluorooctanoic acid

PFOS ..... perfluorooctane sulfonate

POA..... Don Young Port of Alaska

POP..... Persistent organochlorine pollutant

PPCP ..... pharmaceuticals and personal care products

PPD..... phenyl-p-phenylenediamine

ppt ..... parts per trillion

QAPP..... Quality Assurance Project Plan

re 1 µPa m ..... Referenced to 1 microPascal at 1 meter

RME..... reasonable maximum exposure

SAR..... Stock Assessment Report

SEG..... sustainable escapement goal

SIU ..... significant industrial user

SNUR ..... Significant New Use Rule

SSWQC..... Site-Specific Water Quality Criteria

SVOC..... semi-volatile organic compound

TAH..... total aromatic hydrocarbons

TAqH..... total aqueous hydrocarbons

TPAH..... total polycyclic aromatic hydrocarbons

TRC.....total residual chlorine

TSS.....total suspended solids

TUc.....chronic toxicity unit

UCL95.....95% upper confidence limit

U.S.....United States

U.S.C.....United States Code

UME.....unusual mortality event

VOC.....volatile organic compound

WET.....whole effluent toxicity

WNP.....Western North Pacific

WOE.....weight of evidence

WWTF.....wastewater treatment facility

ZID.....Zone of Initial Dilution

1. Introduction

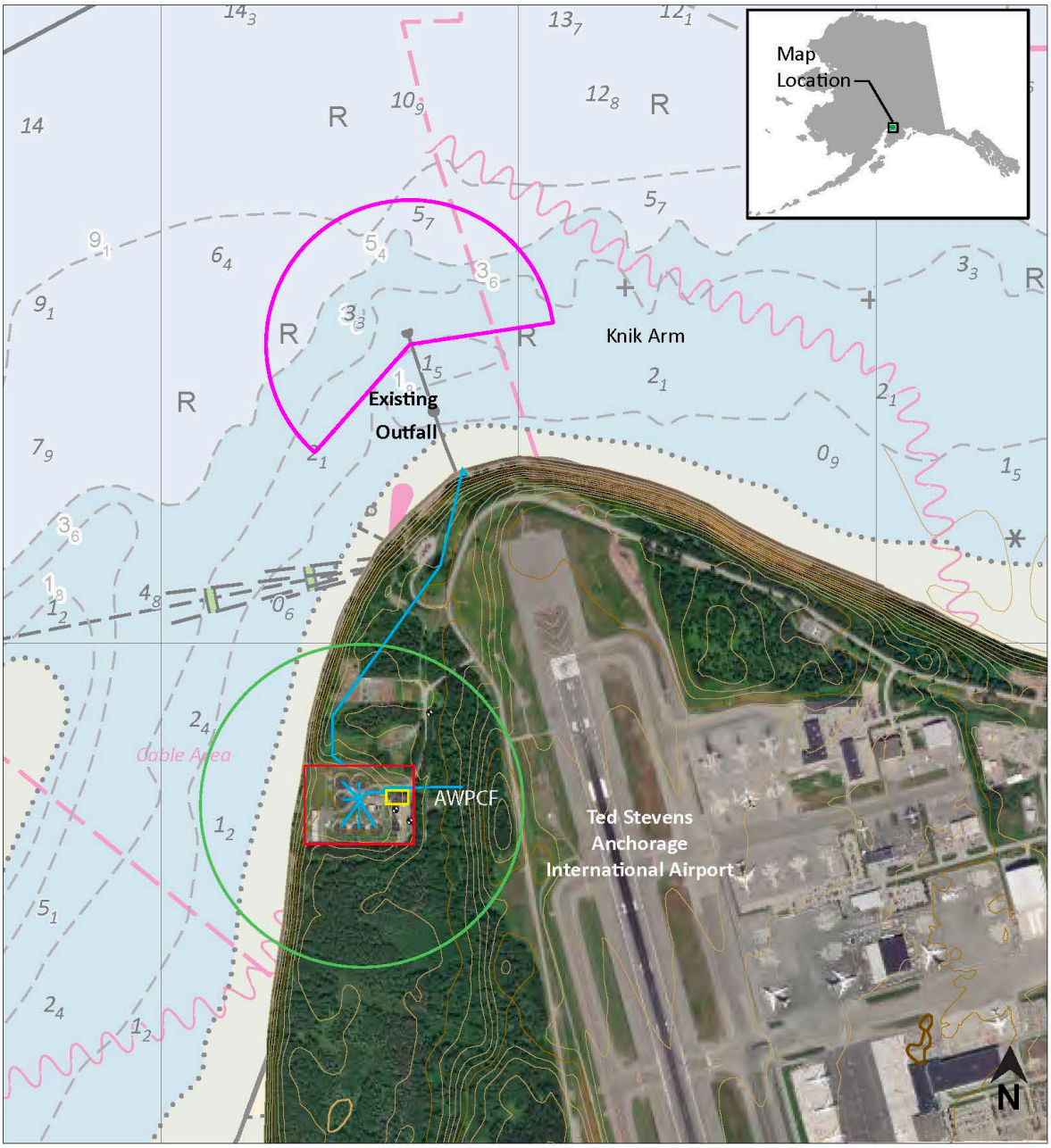
This Biological Evaluation (BE) has been prepared pursuant to Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended (16 *United States Code* [U.S.C.] Section 1531 et seq.), to evaluate potential effects of the United States Environmental Protection Agency's (EPA's) reissuance of a National Pollutant Discharge Elimination System (NPDES) permit with Section 301(h) modifications for the continued operation of the City of Anchorage Water and Wastewater Utility (AWWU) John M. Asplund Water Pollution Control Facility (AWPCF) in Anchorage, Alaska. The proposed action is EPA's reissuance of the NPDES permit with Section 301(h) modifications under the Clean Water Act (CWA) (33 U.S.C. Section 1251 et seq.).

1.1 Proposed Action and Purpose of the Biological Evaluation

AWWU has submitted an application to EPA to renew its NPDES permit with Section 301(h) modifications for the AWPCF located at Point Woronzof in Anchorage, Alaska (refer to **Figure 1-1**). As a part of the renewal and decision process, EPA must obtain federal agency certifications that a proposed action reauthorizing a modification of the NPDES permit under Section 301(h) of the CWA (permit reissuance) will not adversely affect threatened or endangered species or their critical habitats, as listed by the National Marine Fisheries Service (NMFS) in the area of the AWPCF outfall. In addition, the Alaska Department of Environmental Conservation (ADEC) may require a Section 401 certification, in accordance with Section 401 of the CWA. The Section 401 certification from ADEC may specify that the discharge will comply with the CWA, the Alaska Water Quality Standards (AWQS), and other applicable state laws.

AWWU, as the applicant, has prepared this BE to evaluate the potential effects on federally listed and candidate species and their designated critical habitats that could result from continued operation of the AWPCF in Anchorage, Alaska. This BE provides information to NMFS on the anticipated effects of the proposed action to support Section 7 consultation under the ESA. The best available scientific information on the upper Cook Inlet biological community is used as the basis for evaluating current conditions and whether the water quality "assures the protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife…" as specified in the Criteria and Standards for the NPDES (40 *Code of Federal Regulations* [CFR] Part 125, Subpart G, Section 125.62).

Figure 1-1. AWPCF Located at Point Woronzof in Anchorage, Alaska



1.2 Approach to the Biological Evaluation

The BE is consistent with the guidelines outlined in the NMFS Alaska Region Technical Guidance on ESA consultation[2]. The supporting information to this BE has been organized and evaluated following the general framework established in EPA's *2016 Weight of Evidence in Ecological Risk Assessment* (EPA 2016b). This weight of evidence (WOE) framework provides a mechanism to present multiple lines of evidence collectively to provide increased confidence in the decision-making process regarding potential exposure and risk to ESA-listed marine mammals and their prey species from AWPCF effluent.

The WOE framework has three main steps: assemble the evidence, weight the evidence with respect to properties, and weigh the integrated body of evidence. The three main steps are:

- **Assemble the Evidence** – The success of the WOE depends on identifying valuable evidence that can be used to infer causality. Evidence can include information on exposure, responses, and potential relationships among these factors. The assembled evidence is sorted into categories so that similar pieces of evidence can be weighed before being integrated into the conclusions.
- **Weight the Evidence** – Each piece of evidence within a category is evaluated for strength, reliability, and uncertainties/limitations. Weighting the evidence determines the degree of influence for each piece of evidence and for evidence categories as a whole. As a result, some pieces of evidence are considered to be more influential than others. Evidence weighting may be accompanied by a grading system if warranted. For purposes of this BE, the evidence is discussed in detail and supporting information provided. A grading system was not used.
- **Weight the Integrated Body of Evidence** – The body of evidence for each larger category is then evaluated to determine if the risk hypotheses for the site are supported. Collectively, the evaluation of the lines of evidence provides increased confidence in that the best available scientific information has been reviewed and evaluated to support the decision-making processes related to the proposed action.

1.2.1 Assemble the Evidence

The process begins by gathering a wide range of information relevant to the assessment. This information demonstrates the integration of both existing scientific knowledge and site-specific data. More than 830 data sources were reviewed for this BE and, of those, more than 465 sources were integrated into the analysis, including AWPCF monitoring reports, scientific literature, and site-specific studies, to evaluate exposure and potential risks to ESA-listed species and their designated critical habitat. Sources of evidence included peer-reviewed literature in addition to the following work completed specifically in support of the permit renewal:

- AWPCF NPDES Monitoring Reports spanning 20 years, from 2004 to 2023, such as Kinnetic Environmental Inc. (2004, 2005, 2020, 2021, 2022, 2023a, 2024a) documenting that AWPCF consistently met its permit requirements.
- AWPCF Pretreatment Leachate and Joint Base Elmendorf-Richardson (JBER) Toxicity and Chemical Testing results (Kinnetic Environmental Inc. 2024e) documented additional monitoring done to further characterize the leachate accepted at AWPCF.

[2] https://www.fisheries.noaa.gov/insight/endangered-species-act-section-7-alaska-region; Accessed March 2025

- AWPCF Outfall Mixing Zone Study (Jacobs 2024) was completed to predict mixing and transport of the effluent-derived water column and sediment constituents. To support this work, a new bathymetric survey was performed and the outfall was confirmed via dive inspection to be operating as designed.
- AWPCF Marine Sediment and Benthic Infauna Technical Memorandum (Kinnetic Environmental Inc. 2024f) documented the benthic marine habitat as well as the physical and chemical environment in the ZID and nearfield area.
- AWPCF Fish Community and Tissue Bioaccumulation Technical Memorandum (Kinnetic Environmental Inc. 2023b, 2024c) documented both the abundance and distribution of fish communities and assessed any discharge-related effects on the fish.
- Ecological Risk Evaluation (Appendix C), including hazard quotients (HQs) provided an evaluation of the risk from exposure to residual contaminants in the AWPCF effluent.

1.2.2 Weight the Evidence

The gathered data and information were organized into specific categories to provide a structured framework for the assessment. The lines of evidence contributing to each category include both qualitative and quantitative studies and investigations. These categories are summarized in **Table 1-1** and include the following:

Table 1-1. Biological Evaluation - Weight of Evidence Evaluation

Category of Evidence	Lines of Evidence	Summary	Section
Introduction	Objectives, Scope, and Approach	-Proposed action and purpose of the Biological Evaluation -WOE approach	Section 1
Project Description	WPCF Description	-Pretreatment program/non-industrial source control program -Treatment system -Outfall design	Section 2.1
	NPDES Description	-Current permit requirements -In plant monitoring of influent, effluent, and sludge -WET testing	Section 2.2 Appendix A
	NPDES Renewal Studies	-Supplemental sampling 2022-2024 -Sampling of influent sources	Section 2.3 Appendix A
	Near Field and Far Field Dilution Modeling	-Site-specific discharge information under range tidal conditions to document discharge dilutions -Use field measured current velocities, directions, and dilutions to develop dilution model for AWPCF outfall -Use dilution model to establish updated ZID and CID for use in the updated NPDES permit and ecological effects assessment	Section 2.4 Appendix B

Category of Evidence	Lines of Evidence	Summary	Section
	Regulatory Actions Relating to NPDES Permit	-Regulatory actions related to the permit -Revisions to the mixing zone regulations -Listing of ESA-species	Section 2.5
Action Area	Permit Action Area	-Definition of the action area for purposes of the BE and NPDES permit renewal	Section 3
Environmental Baseline	Physical Setting	-Tides and Currents -Sea ice -Substrate	Section 4.1
	Water and Sediment Quality	-General chemistry -Metals -Organic Compounds -Emerging pollutants of concern	Section 4.2
	Biological Conditions	-Marine flora -Marine invertebrates -Marine fish	Section 4.3
	Anthropogenic Conditions in UCI	-Ted Stevens International Airport -Port of Alaska and Port MacKenzie -Urban development -Vessel traffic and underwater sound -Municipal wastewater treatment facilities and discharges -Commercial, recreational, and subsistence fisheries -Seafood processing facilities and discharges -Oil and gas activities and discharges	Section 4.4
	Climate Change	-Effects on ESA-listed marine mammals -Effects on fish	Section 4.5
ESA-Listed Species	ESA-Listed Species Occurrence	-ESA-listed species occurring in the action area -ESA-listed species infrequently occurring in the action area -ESA-listed species rarely occurring in the action area	Section 5 Appendix E
Potential Effects of the Action	Monitoring Results	Comparison of site-collected data against regulatory standardsResults of WET testing	Section 4.2Section 6.1
	Ecological Risk Evaluation	Site-specific risk estimates for prey fish and ESA-listed species -End of pipe - ZID -Cook Inlet exposure areas	Section 6.2 Appendix C

Category of Evidence	Lines of Evidence	Summary	Section
	Cumulative Effects	Effects of future state or private activities, not involving federal activities, that may occur within the action area	Section 6.3
	Toxicity Review	-Literature review of potential toxicity to prey fish and ESA-listed species	Appendix F
Integration of Body of Evidence	WOE	-Summation of the weight of evidence -Consideration of uncertainties/limitations	Section 7.1
	Determination of Effects to ESA-Listed Species	Conclusions for site hypotheses 1) Does the overall weight of evidence indicate a potential for adverse effects to prey species for ESA ESA-listed and candidate species (Cook Inlet beluga whale and the Western DPS Stellar sea lions) occurring in the zone of dilution (ZID) or farfield areas (Knik Arm, upper Cook Inlet, and Turnagain Arm)?	Section 7.2
	Determination of Effects to Prey Species	2) Does the overall WOE indicate a potential for adverse effects to ESA-listed and candidate species (Cook Inlet beluga whale and the Western DPS Stellar sea lions) and critical habitats within the ZID or the farfield areas of Knik Arm, Mid-Upper Cook Inlet, and/or Turnagain Arm that are under the jurisdiction of NMFS.	Section 7.3
	Potential Effects on Essential Fish Habitat	3) Does the overall weight of evidence indicate a potential for adverse effects to essential fish habitat (EFH) in the action area?	Section 7.4

- Project Description: This includes information about the AWPCF facility and its NPDES permit (**Section 2**).
  - AWPCF Facility – Description of the pretreatment programs, treatment system, and outfall design.
  - NPDES Permit – Annual in-plant required monitoring results for influent, effluent, and sludge; whole effluent toxicity (WET) testing results; and receiving water quality monitoring in the vicinity of the discharge and mixing zone; supplemental studies completed to support renewal of the NPDES permit, including aquatic sampling and hydrodynamic modeling to establish updated Zone of Initial Dilution (ZID); related regulatory actions; and definition of the permit action area.
- Action Area: Description of the updated action area proposed for the NPDES permit renewal (**Section 3**).
- Environmental Baseline: This category considers factors such as the current physical setting, water and sediment quality, biological conditions, anthropogenic conditions in the upper Cook Inlet, and climate change (**Section 4**).

- ESA-Listed Species: Detailed description of Cook Inlet beluga whales and Steller sea lions and their habitats, drawing on peer-reviewed literature and site-specific monitoring (**Section 5)**.
- Potential Effects of the Action: Includes a comparison of data collected from monitoring and supplemental studies against available regulatory levels, a summary of results of the quantitative risk modeling for prey species and ESA-listed species, a review of relevant literature toxicity studies that focus on potential effects to prey species or ESA-listed species, and an evaluation of potential cumulative effects (**Section 6**).
- Determination of Effects: The summation of the lines of evidence and determination of effects to ESA-listed species, their critical habitat, and essential fish habitat are provided in **Section 7**.

1.2.3 Evaluating the Evidence

The overall evaluation of the body of evidence can be qualitative, quantitative, and/or semi-quantitative depending on the lines of evidence available for the site. For this BE, both qualitative and quantitative lines of evidence have been evaluated. The overall objective is to inform whether the proposed action is likely to result in effects on ESA-listed species or their critical habitat. As such, the hypotheses being evaluated for this BE are:

- Does the overall weight of evidence indicate a potential for adverse effects to prey species for ESA-listed and candidate species (Cook Inlet beluga whale and the Western DPS Steller sea lions) occurring in the ZID or farfield areas (Knik Arm, upper Cook Inlet, and Turnagain Arm)?
- Does the overall weight of evidence indicate a potential for adverse effects to ESA-listed and candidate species (Cook Inlet beluga whale and the Western DPS Steller sea lions) and critical habitats within the ZID or the farfield areas of Knik Arm, mid-upper Cook Inlet, and/or Turnagain Arm that are under the jurisdiction of NMFS?
- Does the overall weight of evidence indicate a potential for adverse effects to EFH in the action area?

2. Site Description

This section provides an overview of the AWPCF, including the treatment programs, outfall design, existing NPDES permit requirements, and permit renewal requirements.

2.1 John M. Asplund WPCF Description

AWWU owns and operates the AWPCF, which serves the entire Anchorage area. AWPCF influent is primarily domestic, with a minor industrial component. There are no combined sewers in the Anchorage sewer system. The AWPCF receives flows from JBER and sludge from AWWU's Eagle River and Girdwood Wastewater Treatment Facilities (WWTFs). In addition, leachate is accepted from the Anchorage Regional Landfill, the Merrill Field Landfill, and the Matanuska Susitna Borough Landfill. These and all other significant industrial users are subject to AWWU's pretreatment requirements described in Section 2.1.1.

2.1.1 Pretreatment Program and Non-Industrial Source Control Program

Industry discharges can have a significant impact on wastewater treatment facilities and are essential to control and reduce potentially toxic discharges before they enter the municipal sewerage system. In response to a nationwide need, the EPA instituted the National Pretreatment Program under 40 CFR 125.66 (c)(1). EPA approved AWWU's Pretreatment and Non-Industrial Source Control Program in April 1982 to minimize potentially negative influent into the AWPCF. AWWU developed a Pretreatment Enforcement Response Plan and submitted it to the EPA in June 2022.

AWWU identifies significant industrial users (SIUs) through routine surveys, questionnaires, review of utility records, review of state printouts of new businesses, and review of building permits. These SIUs are then issued an Industrial Wastewater Discharge Permit establishing a monitoring and enforcement program. Anchorage Municipal Sewer Service Ordinance 26.50 set specific discharge limits for all sewer system users. AWWU personnel conduct discharge sampling, communications regarding violations, and actions toward compliance, as well as investigations of all reports of prohibited discharges to the sewerage system. AWWU also conducts a public outreach campaign designed to educate sewer users on the negative effects of harmful substances.

Fourteen SIUs have been identified by AWWU: Copper River Seafoods (two locations), Merrill Field Landfill Municipality of Anchorage (MOA)-Solid Waste Services, ALSCO (commercial laundry), Anchorage Regional Landfill MOA-Solid Waste Services, JBER, Matanuska Susitna Borough Central Landfill, Chugach Electric Association (Southcentral Power Plant and Sullivan Power Plant), U.S. Ecology Alaska (specialty environmental services contractor that provides spill response, site remediation, industrial cleaning, and hazardous/non-hazardous waste management), Environmental Compliance Consultants (also a specialty environmental services contractor), Inlet Worldwide Oil, Inc. (Jiffy Lube Alaska), Tesoro Logistics Operations, and Chugach Electric Association on Electron Drive.

The EPA requires annual reporting and may audit the pretreatment program periodically to ensure compliance. AWWU prepares and submits to the EPA annual Industrial Pretreatment and Non-Industrial Source Control Program Reports. The annual reports update the list of identified industrial users and provide details on treatment plant monitoring results, any treatment plant upsets, any program modifications, budgets and staffing, industrial user monitoring and inspections, the status of wastewater discharge permits, notifications sent to businesses, any enforcement activities, and any planned program changes. Program details for 2023, including compliance status, inspection and monitoring dates, and monitoring results, are provided in (AWWU 2024).

2.1.2 Treatment System

The AWPCF provides primary treatment designed to remove the settleable and suspended solids. The treatment facility is designed for an average flow of 2.5 cubic meters per second (m^3/sec) (58 million gallons per day [mgd]) and a maximum hourly flow of 6.7 m^3/sec (154 mgd). It currently operates significantly less than design at 1.31 m^3/sec (30 mgd).

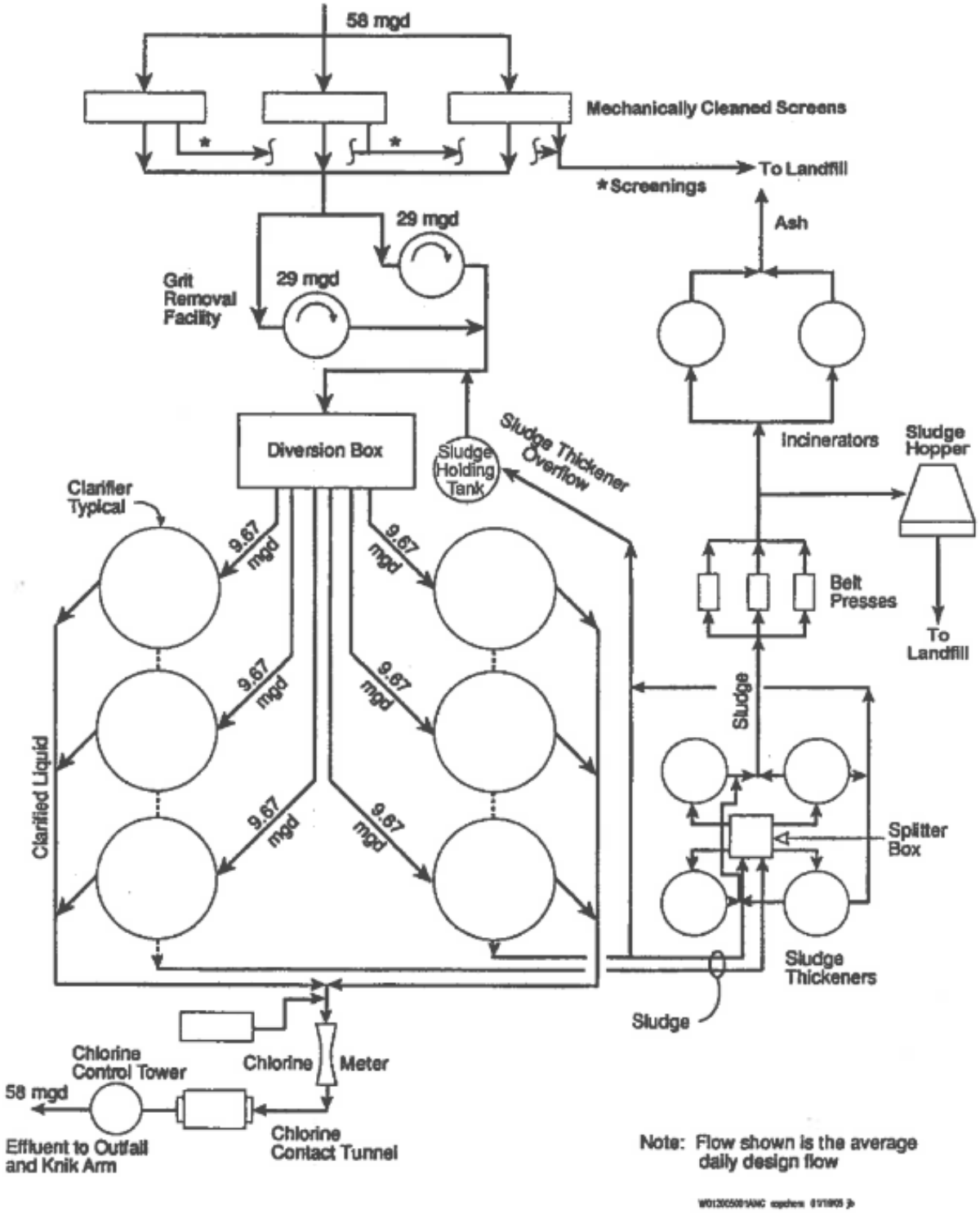
Existing treatment units provide screening, grit removal, sedimentation, skimming, and chlorination. The treatment process results in removal rates that are much higher than typical primary treatment facilities. **Figure 2-1** presents a process flow diagram for AWPCF.

Currently, sludge from the primary clarifiers is thickened and dewatered. The dewatered sludge and skimmings are incinerated and the ash is disposed of in the Anchorage Regional Landfill. Within the permit period, the sludge volume may increase to a level greater than the incinerator capacity. If the incinerator capacity is exceeded, the excess sludge is dewatered and disposed of at the landfill.

2.1.3 Outfall Description

The AWPCF discharges treated and disinfected effluent via Outfall 001 into the marine waters of Cook Inlet offshore of Point Woronzof. The AWPCF outfall includes a 793-meter-long, 3-meter-wide tunnel from the APWCF flume and drop box to the 2-meter-diameter pipe connection into the base of the 13-meter-tall chlorination tower at the Point Woronzof shoreline. It then extends approximately 245 meters north from the chlorination tower as a buried 2.1-meter-diameter reinforced concrete pipe that terminates in a vertical turret structure that extends 3 meters above the 2.1-meter-diameter pipe crown. The structure is designed for optimal diffusion with three 0.6-meter round discharge ports open to the open ocean side of the turret and five closed ports facing the shoreline. These ports are spaced 1 meter apart and discharge at a 45-degree angle of separation. The outfall turret was inspected in October 2023, showing all three ports flowing. The five closed port cover plates and top access hole were in good condition with no detectible leaks. **Figure 2-2** provides excerpts of the outfall turret drawings with annotations to illustrate the three-port diffuser. **Figure 2-3** provides an outfall profile and configuration drawing excerpt.

Figure 2-1. Anchorage Water and Wastewater Utility AWPCF Process Diagram



Source: Kinnetic Environmental (2022)

Figure 2-2. Drawing Excerpts of the AWPCF 2.1-meter (84-inch)-Diameter Outfall with Multi-port Turret Diffuser with Three Open 0.6-meter (23-inch) Ports

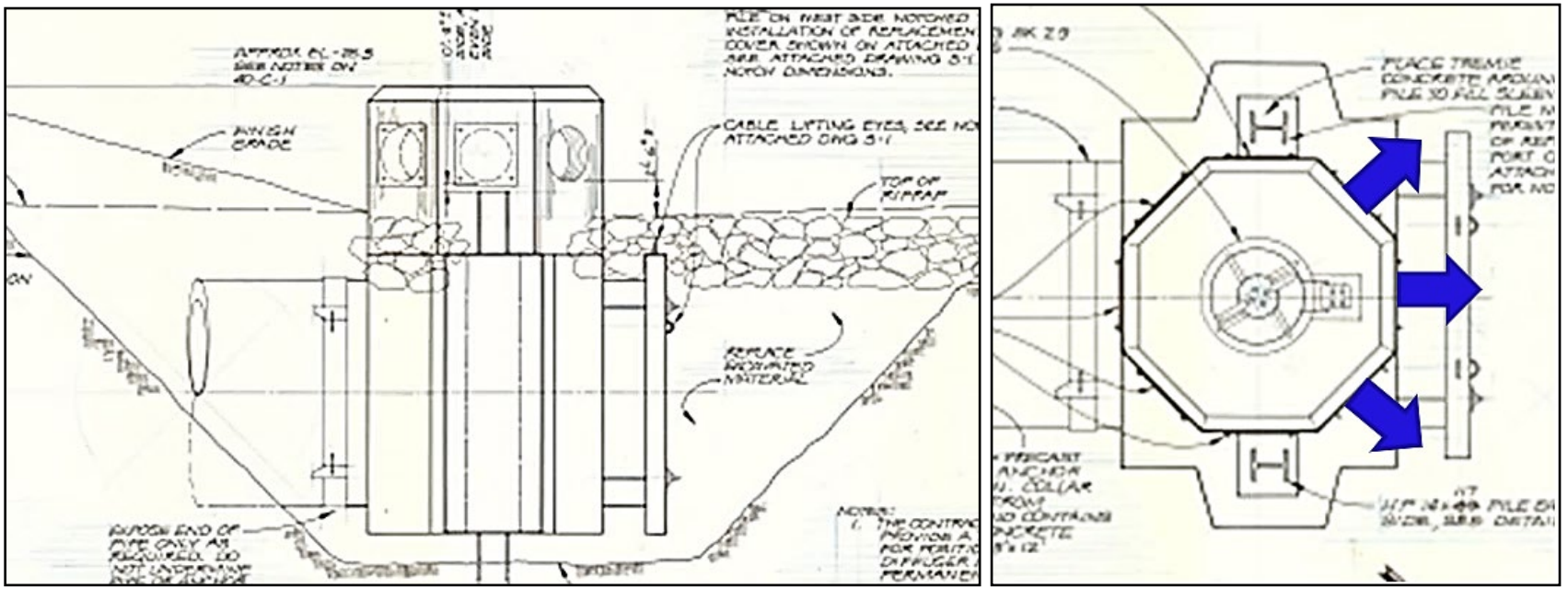
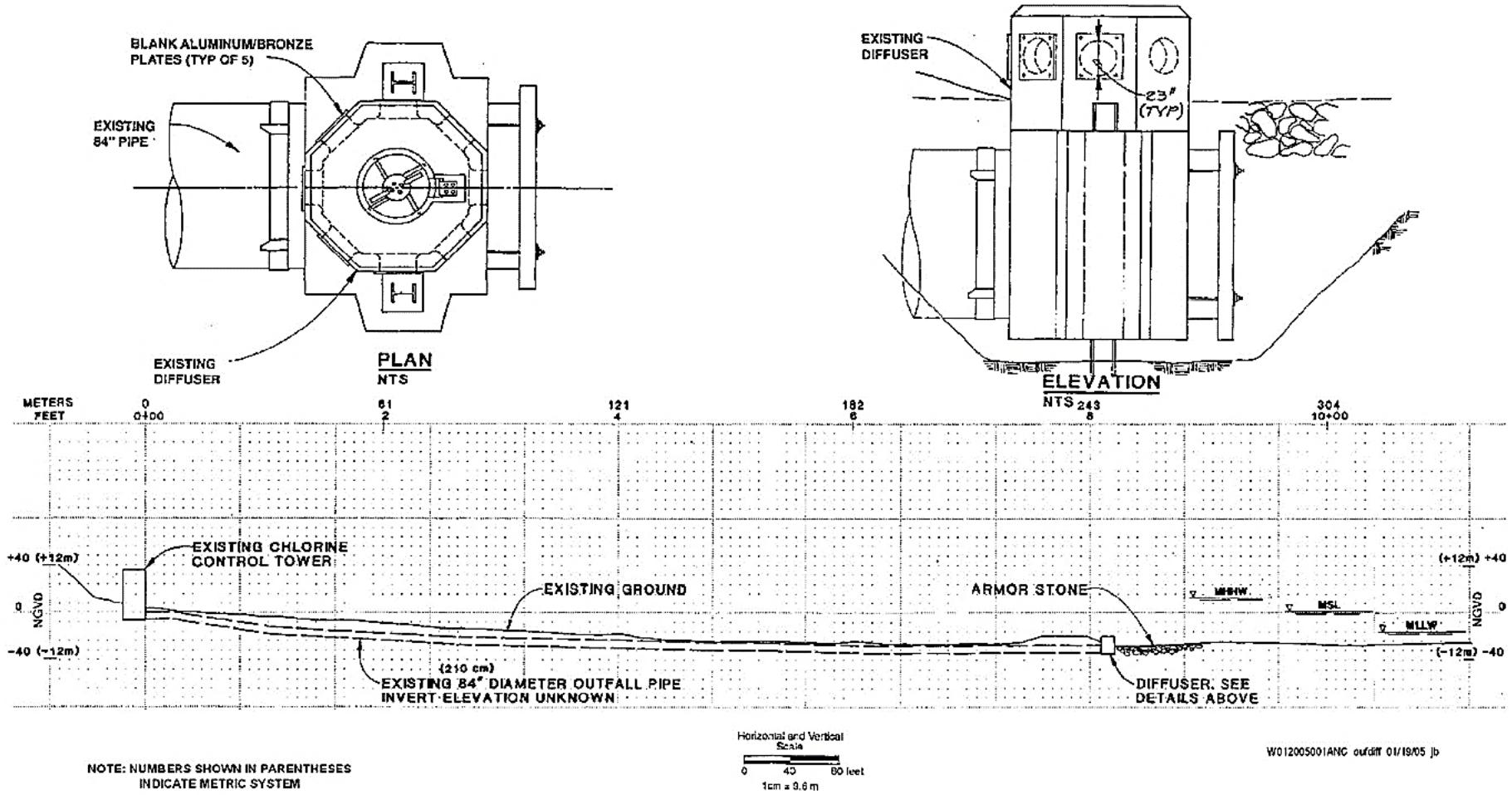


Figure 2-3. Drawing Excerpts of AWPCF Outfall Configuration and Profile



Note: Measurements are shown in Imperial units as shown in the permit.

2.2 AWPCF NPDES Permit Description

The AWPCF discharge is authorized under NPDES Permit No. AK-002255-1 and includes a modification for secondary treatment requirements for total suspended solids (TSS) and 5-day biochemical oxygen demand (BOD_5) (EPA 2000).

AWWU was first issued a NPDES permit on January 20, 1975, valid for 5 years. EPA issues NPDES permits for 5 years and requires a renewal application to extend the permit beyond the initial 5-year period. The initial AWPCF discharge permit was issued prior to the requirement for secondary treatment, which became effective on July 1, 1977, under the Clean Water Act. Two years later in 1979, EPA published criteria allowing a variance from secondary treatment requirements. After years of studies designed to optimize the outfall and chlorination system, EPA issued a renewed permit on October 16, 1985, using the 301(h) variance. EPA subsequently renewed the permit on August 2, 2000. The permit was administratively extended in August 2005 pending a permit renewal decision from EPA. AWWU applied for an NPDES permit renewal in August 2005 and is currently revising its application for submittal in early 2025.

The current NPDES permit defines the ZID as a 650-meter radius from the AWPCF outfall centered 30 meters inshore from the outfall turret, covering 220 degrees and excluding the inshore region where the plume does not reach. The NPDES permit defines the Critical Initial Dilution (CID) as 142:1 at the ZID boundary for conservative effluent constituents (that is, metals and WET) and defines the CID at 180:1 for nonconservative effluent constituents (that is, ammonia and total residual chlorine [TRC]). The existing ZID and CID were developed through dilution modeling and a field dye tracer study conducted in 1988. A key element of NPDES permit renewal is the definition of the ZID and the associated CID, which are described in **Section 2.4**).

2.2.1 Annual Monitoring for NPDES Permit Compliance

Section 301(h) of the CWA defines conditions under which the EPA Administrator may grant modifications of secondary treatment standards. One of the conditions of Section 301(h) is that the treatment facility must develop and implement a program to monitor the impact of the approved discharge on receiving waters and potentially exposed marine biota. To meet this requirement, AWWU has implemented an extensive monitoring program since 1985 (Kinnetic Laboratories Inc. 1987).

Water in the Knik Arm in upper Cook Inlet has naturally high ambient turbidity and nonbioavailable metals concentrations from upstream watershed processes. Therefore, as part of the NPDES permit renewal application in 1999, AWWU applied to ADEC for Site-Specific Water Quality Criteria (SSWQC) for a limited area of upper Cook Inlet in the vicinity of Point Woronzof (CH2MHILL 1998). The proposed SSWQC for acute and chronic chemical criteria (dissolved metals and turbidity) for the Point Woronzof area were incorporated into AWQS,18 *Alaska Administrative Code* (AAC) 70.236(b)(4), and are shown in **Table 2-1** (ADEC 2022c).

Table 2-1. SSWQC Criteria for Upper Cook Inlet in the Vicinity of Point Woronzof

Parameter	Chronic Criteria (µg/L)	Acute Criteria (µg/L)
Turbidity	May not exceed the natural condition	
Arsenic	36	69
Cadmium	9.3	42
Chromium IV	50	1,100
Copper	3.1	4.8
Lead	8.1	210
Mercury	0.025	1.8
Nickel	8.2	74
Selenium	71	290
Silver	-	1.9
Zinc	81	90

Source: ADEC (2022c)
For metals, the criteria are measured as dissolved metal.
µg/L = microgram(s) per liter

The required annual monitoring program includes treatment plant influent/effluent sampling, sewage sludge management procedures, water quality monitoring, biological and toxicological monitoring, and a toxics control program (Kinnetic Environmental Inc. 2023a, 2024a). Specifics of the monitoring program required by the permit are:

- Influent, effluent, and sludge monitoring of:
  - Toxic pollutants and pesticides (two per year)
  - Metals and cyanide (six per year)
  - Pretreatment monitoring of significant industrial user discharge (two per year)
  - WET testing (quarterly)
- Receiving water quality monitoring:
  - Ambient water quality sample collection and hydrographic profiles of temperature, salinity, dissolved oxygen (DO), and pH (one per year)
  - Plume dispersion measurements (one per year)
  - Intertidal bacteria sampling (one per year)
- Sediment and biological sampling and analysis:
  - Sediment (once in 2003)
  - Benthic biota (twice in 1989)
  - Bioaccumulation (once in 2004)

For the period 1987 through 2024, AWWU's annual monitoring reports were completed and submitted to EPA in accordance with permit requirements.

2.2.2 WET Testing

Quarterly final effluent WET testing is required under the existing AWPCF NPDES monitoring program. Typically, some measurable toxicity is detected during each of these monitoring efforts, with the most sensitive test and species typically being the chronic echinoderm fertilization test using the purple urchin (*Strongylocentrotus purpuratus*). However, WET test results continue to comply with the permit limitations with few exceptions (refer to **Appendix A**).

2.3 Studies Supporting Renewal of the NPDES Permit

Supplemental sampling of media and biota potentially exposed to effluent and sampling of influent sources were completed between 2022 and 2024 to provide additional information to this BE and support the permit renewal application. These sampling efforts are described in the following subsections.

2.3.1 Supplemental Sampling

In addition to the basic annual monitoring studies, the 2022, 2023, and 2024 field monitoring and sampling programs included additional sampling and special studies to provide supplemental information to support the current AWWU NPDES permit renewal application and Section 301(h) modification request (Kinnetic Environmental Inc. 2023a, 2024a).

The objectives of the 2022 through 2024 aquatic data collection and monitoring program (including new elements as indicated) were to:

- Measure and document biotic communities in the ZID and specific control sites in the action area.
- Assess effectiveness of the pretreatment program and effluent toxicity controls.
- Sample and test pretreatment sources including leachate, chemicals, and WET testing (new).
- Sample receiving water for priority pollutants (new).
- Provide detailed bathymetry and geophysical characteristics of the ZID area (new).
- Measure the current bathymetry, and surficial habitat in the ZID (new).
- Sample sediments, benthic biota, and the fish community in the ZID and a reference site (new).

The collection of additional data conformed to EPA-approved sampling and analytical procedures, as described in the 2022 and 2023 Quality Assurance Project Plans (QAPPs) (Jacobs and Kinnetic 2022, 2023). Sampling occurred near the outfall, up- and down-coast of the outfall, and across Knik Arm. The 2022 program included marine receiving water quality sampling, current measurements, a bathymetry survey, sediment quality assessment, benthic infauna collection, and fish community analyses (Kinnetic Environmental Inc. 2023b, a). In 2023, the program included all the elements of the 2022 program, with the exception of benthic community sampling (Kinnetic Environmental Inc. 2024a, c). In 2024, fish community and tissue bioaccumulation on AWPCF also tested five species (eulachon [*Thaleichthys pacificus*], Pacific cod [*Gadus microcephalus*], threespine stickleback [*Gasterosteus aculeatus*], starry flounder [*Platichthys stellatus*], and spot shrimp [*Pandalus platyceros*]) collected within the action area and controlled sites for priority pollutants and emerging pollutants of concern (EPOCs; also referred to as contaminants of emerging concern or CECs). Monitoring program results are summarized in **Appendix A** and were used to describe the Environmental Baseline (refer to **Section 4**) and support the Ecological Risk Evaluation (refer to **Section 6**).

2.3.2 Sampling of Influent Sources

While AWPCF's influent sources are primarily of domestic origin, there are a limited number of industrial components. In 2024, supplemental testing consisting of the same toxicity testing conducted annually for

AWPCF was undertaken on six specific large inputs to Anchorage's wastewater system to determine if those sources could account for a significant portion of the toxicity found in the AWPCF's effluent discharge. The source inputs to the wastewater system that were examined included leachate from the Anchorage Regional Landfill, Merrill Field Landfill, and the Matanuska-Susitna Borough's Central Landfill, along with three separate influent streams from the JBER. Toxicity testing followed the guidelines established by EPA's *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms* (EPA 2002). Results of this supplemental sampling are presented in **Section 4.4** and are available in the summary report provided to AWWU (Kinnetic Environmental Inc. 2024e).

2.4 Hydrodynamic Modeling for NPDES Permit Renewal

Numerical modeling of the transport and distribution of effluent and effluent constituents from the AWPCF is required to support the evaluation of potential exposure and effects for this BE. A three-dimensional hydrodynamic and transport model was developed for the upper Cook Inlet and is presented in **Appendix B**. The model simulates the hydrodynamic and transport processes based on: tidal currents; wind-generated currents; freshwater inflow from major rivers; water column density effects; open water and iced-over conditions; and effluent loading from the AWPCF. The model was used to predict mixing and transport, including nearfield plume dilution and farfield circulation of effluent-derived water column and sediment constituents. As described in **Section 3**, the proposed ZID boundary and the farfield modeling are used to define the action area in this BE.

2.4.1 Nearfield Modeling

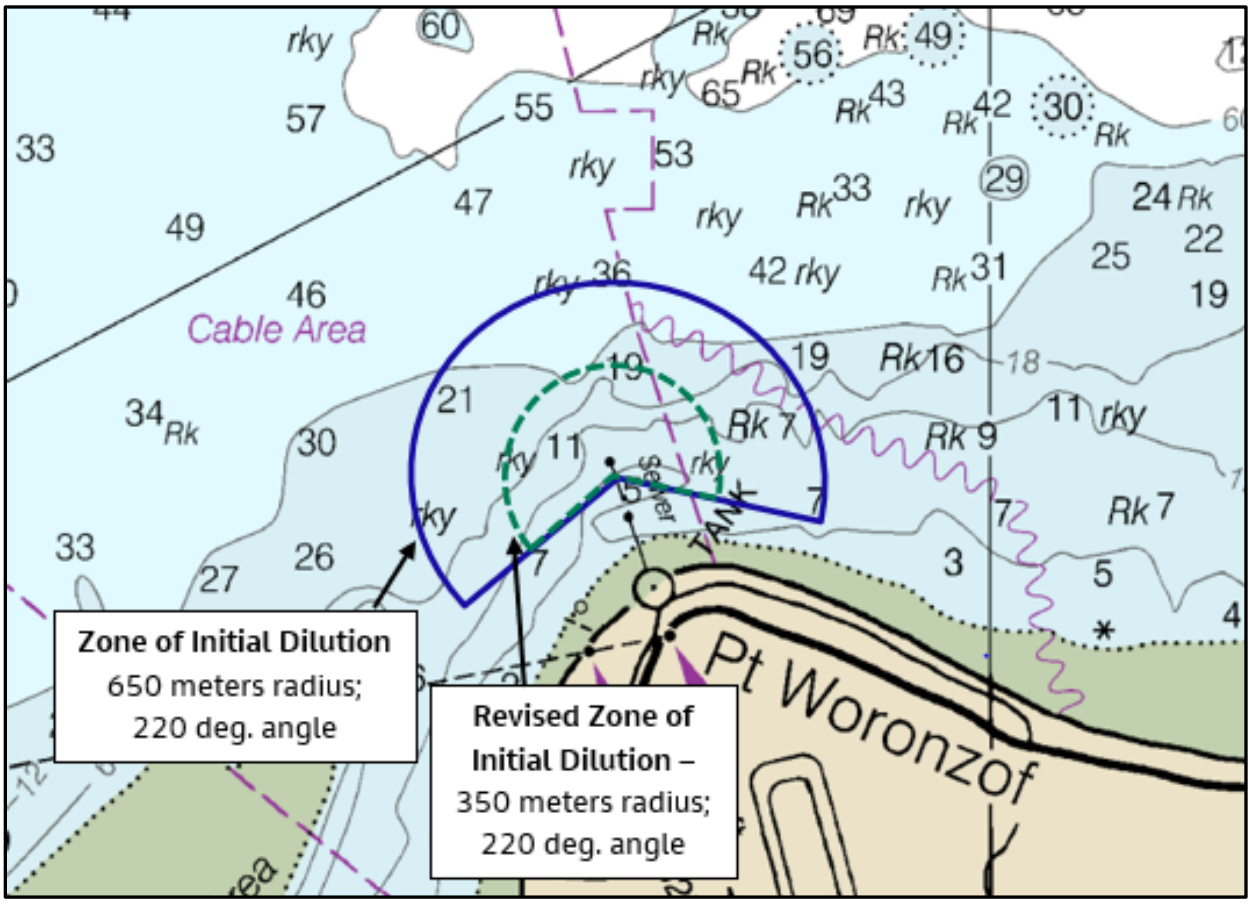
Nearfield modeling was previously conducted (CH2M HILL 1998b) for this discharge using the EPA UDKHDEN initial dilution model and subsequent dilution routines based on a passive diffusion analysis (the Brooks method), which was accepted by EPA at that time. Updated nearfield modeling was conducted as part of this BE effort **(Appendix B** and Jacobs 2024).

In 2022, Jacobs conducted an extensive 2-day field study of the AWPCF outfall discharge to measure dilutions under a wide range of ebb and flood tide conditions. The primary objective of the modeling was to assess the distribution of AWPCF discharge within the Class 1 and Class 2 critical habitat area for the beluga whale (refer to **Figure B-1)**. Therefore, the model domain was developed primarily from beluga whale migration patterns. Available data and previous modeling studies also were considered. The regions evaluated in the model included mid upper Cook Inlet, Knik Arm, and Turnagain Arm. The results of the field dilution study were compared to dilution modeling results using EPA Visual Plumes models (DKHW and UM3) and CORMIX models. Based on detailed comparisons, the CORMIX1 initial dilution model was selected to represent the AWPCF outfall discharge. Results of the modeling study included:

- The model simulations reproduce the general circulation and transport patterns of the upper Cook Inlet and provide a sound technical basis to evaluate the transport and distribution of AWPCF discharge constituents in the modeled area.
- The model results clearly show the geographic and seasonal variability of effluent distribution. The effects of degradation on the distribution of effluent constituents were clearly demonstrated.
- The model-predicted concentrations of a dye-tracer and effluent-derived TSS were extremely low:
  - Average dilutions of whole effluent over the modeled regions range from more than 1,000:1 to approximately 20,000:1 for conservative substances that do not degrade rapidly with time.

  - The concentration of effluent-derived suspended sediments is more than six orders of magnitude smaller than the concentration of natural sediments.
  - The deposition of effluent-derived sediments will occur in only limited areas and comprise an extremely small fraction of the total sediment deposits.
- The model was used as the basis for predicting distribution and concentration of pollutants of concern in the AWPCF effluent.
- Results of the study were used to propose a revised ZID in the same shape as that in the existing permit but approximately one-half the linear dimensions, with a 350-meter radius and a revised CID of 109:1. The discharge plume travel time within the 350-meter ZID is less than 10 minutes (Jacobs 2024). **Figure 2-4** presents the permitted 650-meter ZID (solid blue line) and the new proposed 350-meter ZID (dashed green line).

Figure 2-4. Recommended Revised ZID and the Existing ZID for the AWPCF Outfall Offshore of Point Woronzof



Source: Excerpt from NOAA Chart 16665

2.4.2 Farfield Modeling

In 2010, an Environmental Fluid Dynamics Code (EFDC) (Hamrick 1996) model was used to represent the best farfield hydrodynamic model to evaluate mixing, fate, and transport of the pollutants of concern, taking into account plume modeling and Cook Inlet characteristics. The AWPCF effluent flows applied to

the 2010 farfield model (AWWU 2011) are the same as the present flow, as AWPCF effluent flow has remained steady or declined during the last decade. The other model boundary conditions (solid boundary and riverine inputs) and the model driving forces (tides, freshwater inputs, wind, and atmospheric conditions) have not changed since the 2011 modeling setup. Therefore, no changes are required to the farfield modeling.

The EFDC model simulated three-dimensional flow, transport, and biogeochemical processes in surface water systems and was configured to include Cook Inlet beluga whale critical habitat. Transport and distribution of effluent from AWPCF was simulated for an entire year, including during ice-covered conditions in Cook Inlet, for three categories: (1) conservative substances (no degradation); (2) slowly degrading substances (150-day half-life); and (3) rapidly degrading substances (7-day half-life), to represent a range of pollutants of concern found in AWPCF final effluent. The results of the 2010 farfield model were expressed in terms of dilutions, which allows evaluation of parameters and pollutants of concern in the assessment of potential toxicity to marine species. Dilution factors (DFs) developed as part of the modeling were used for the ecological risk evaluation (refer to **Appendix C**) and included: edge of the ZID (DF = 109); Knik Arm (DF = 1,223); upper Cook Inlet (DF = 2,189); and Turnagain Arm (DF = 9,385).

2.5 Federal Action History and Other Relevant Regulatory Actions

AWWU applied for and received its initial NPDES permit (EPA 2000) with Section 301(h) modifications in 1985, which was administratively extended and subsequently renewed in 2000 and updated in 2005. A 2011 BE (AWWU 2011) provided a comprehensive overview of biological communities in the vicinity of the AWPCF outfall at that time to support administrative extension of the NPDES permit with Section 301(h) modifications. As a separate but related action from the AWPCF NPDES permit, on September 29, 2006, the EPA submitted a BE (EPA 2006) to NMFS concerning EPA's Revisions to the Mixing Zone Regulations (MZR) of the AWQS. The EPA proposed to approve revisions to the State of Alaska's mixing zone regulation section of 18 AAC 70.240 for AWQS (18 AAC 70) that were adopted into Alaska law on March 23, 2006. The BE for the MZR addressed the effects of revisions to the regulations on endangered or threatened species under NMFS jurisdiction and their designated critical habitats.

In a letter dated August 5, 2008, NMFS concurred with EPA's determination that approving the MZR was not likely to adversely affect listed species under NMFS jurisdiction. At that time, Cook Inlet beluga whales were not listed as threatened or endangered under the ESA, and NMFS chose not to consult on the whales at that time, pending the listing decision. NMFS listed Cook Inlet beluga whales as endangered on October 22, 2008 (73 *Federal Register* [FR] 62919). ESA Section 7 consultation was then reinitiated by EPA on December 20, 2010, to address the effects of approving the MZR on the newly listed endangered Cook Inlet beluga whales. In response, NMFS issued a Biological Opinion (BiOp), which concluded that EPA approval of the MZR was not likely to jeopardize the continued existence of Cook Inlet beluga whales.

After listing Cook Inlet beluga whales as endangered under the ESA, on April 11, 2011, NMFS issued a final rule designating critical habitat for the belugas (76 FR 20180). On December 20, 2016, NMFS received a letter from EPA requesting reinitiation of formal consultation on the effects of EPA approval of the MZR following designation of Cook Inlet beluga whale critical habitat. On December 27, 2016, NMFS published the *Recovery Plan for the Cook Inlet Beluga Whale* (NMFS 2016b). As part of the recovery effort, the Cook Inlet Beluga Whale Recovery Implementation Task Force was created, which includes three committees: a Research Committee, a Habitat and Threats Management Committee, and an Outreach Committee. AWWU currently has a representative that participates in the Outreach Committee. On February 25, 2021, NMFS published a notice in the FR to announce the initiation of a 5-year status review of Cook Inlet beluga whales (NMFS 2021c) (refer to **Section 5.1** for additional details).

To address the fact that the 2010 NMFS BiOp did not evaluate the effects of EPA's approval of the MZR revisions on Cook Inlet beluga whale critical habitat, in the December 20, 2016, consultation letter, EPA concluded that the proposed action was likely to adversely affect three of the physical or biological features[3] (PBFs) of Cook Inlet beluga critical habitat, specifically: (1) intertidal and subtidal waters of Cook Inlet with depths less than 30 feet (9 meters) mean lower low water (MLLW) and within 5 miles (8 kilometers) of high and medium flow anadromous fish streams; (2) primary prey species consisting of four species of Pacific salmon (Chinook, sockeye, chum, and coho), Pacific eulachon, Pacific cod, walleye pollock, saffron cod, and yellowfin sole; and (3) waters free of toxins or other agents of a type and amount harmful to Cook Inlet belugas (NMFS 2019a). Following a series of consultations, NMFS notified EPA on April 6, 2018, that all the necessary information had been received and that formal consultation could be reinitiated.

On July 2, 2019, NMFS completed a new BiOp on the EPA's proposed approval of the State of Alaska's MZR Section of the AWQS (NMFS 2019a). NMFS concluded that EPA approval of the State of Alaska's 2006 MZR (18 AAC 70.240) was not likely to destroy or adversely modify designated Cook Inlet beluga whale critical habitat. NMFS further concluded that no new information indicated that the effects of EPA's action on Cook Inlet beluga whales themselves had changed since the 2010 BiOp. Therefore, the conclusion in the 2010 BiOp that EPA's action would not jeopardize the continued existence of the Cook Inlet beluga whale was still valid.

The NMFS 2019 BiOp on the revised MZR for wastewater treatment facilities permitted by the State of Alaska[4] (although not specifically the AWPCF) provides recent scientific information that, along with other recent literature, is summarized in this BE.

[3] Later referred to as primary constituent elements (PCEs) in the 2011 Cook Inlet beluga whale critical habitat designation.
[4] Permitted under the Alaska Pollution Discharge Elimination System (APDES), which began in 2008.

3. Action Area

The action area for this permit is defined as a 350-meter radial distance from the AWPCF outfall at Point Woronzof (**Figure 2-4**), as defined by the updated ZID (refer to **Section 2**). The intent of the ZID is to encompass the area within which effluent constituents are mixing with waters in Cook Inlet.

All constituents must meet AWQS at 350 meters from the outfall; as required (EPA 1985a) specifically, the point of compliance for the NPDES permit is at the outer edge of the ZID at 350 meters. However, in accordance with 18 AAC 70.240, Mixing Zones (ADEC 2022c), EPA and ADEC may seek a smaller mixing zone area that is feasible for a discharge to meet AWQS and be protective of the receiving water quality. ADEC states that a mixing zone must protect overall biological integrity and must be as small as practicable.[5] For certain constituents, ADEC may establish state mixing zones within the ZID boundary; however, as of the publication of this BE, ADEC has not yet developed the Section 401 Certification that would establish state mixing zone boundaries. The target minimum dilutions needed for the AWPCF outfall discharge to meet *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (ADEC 2022b) are:

- Acute Aquatic Life Criteria Dilution Minimum of 87, based on effluent TRC concentrations.
- Chronic 4-day Aquatic Life Criteria Dilution Minimum of 150, based on effluent TRC concentrations.
- Chronic Human Health Criteria Dilution Minimum of 2, based on effluent mercury concentrations.

As reported in Jacobs (2024), based on the CORMIX-1 modeling results at the recommended ZID boundary distance of 350 meters, CIDs (that is, the dilution minimum) are 70 for acute aquatic life criteria, 169 for chronic aquatic life criteria, and 240 for human health criteria. These dilutions are based on worst-case dry season modeling. For all discharge conditions, the plume travel time to the recommended ZID distance of 350 meters is less than 10 minutes (Jacobs 2023). These minimum dilutions (CIDs) meet the target values needed for the AWPCF outfall discharge to meet criteria published in the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (ADEC 2022b).

For the farfield zone beyond the ZID, taking into account Cook Inlet characteristics that influence mixing, fate, and transport of the pollutants of concern, the EFDC model estimated average dilutions of effluent constituents across modeled regions to range between 1,200:1 and 20,000:1 for substances that do not degrade rapidly with time. In other words, the EFDC model indicated that potential pollutants of concern, if they existed in AWPCF effluent, would have high dilution factors in the farfield zone outside of the ZID (Jacobs 2024). Given these high dilution ratios, the ZID boundary is used to define the boundary of the action area for estimating potential exposure of species analyzed in detail in this BE.

[5] https://dec.alaska.gov/water/water-quality/mixing-zones/; Accessed March 13, 2024.

4. Environmental Baseline

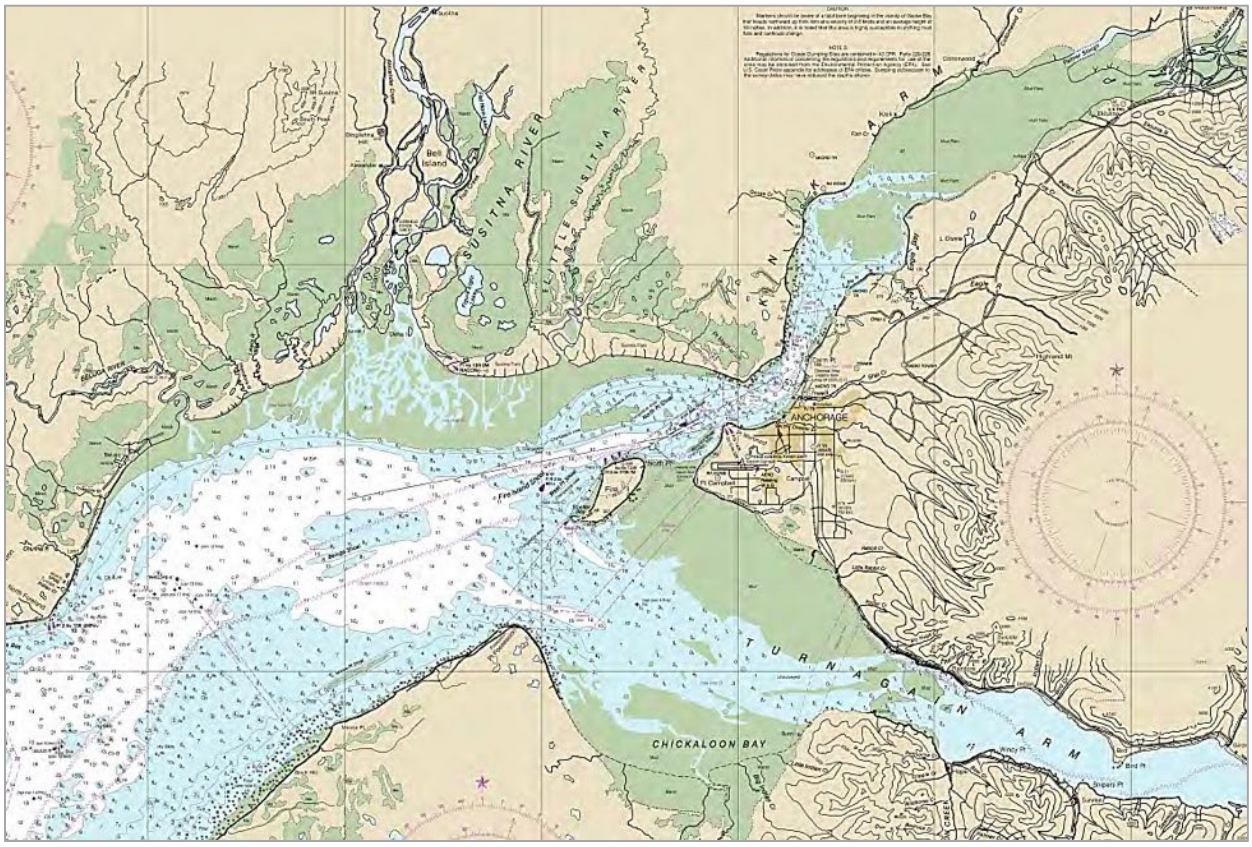
The environmental baseline provides an overview of current physical, chemical, and biological conditions in the action area; describes potential sources of contaminants to the action area; and discusses potential effects of climate change on ambient conditions.

4.1 Physical Setting

Cook Inlet is a semi-enclosed, subarctic tidal estuary within the Cook Inlet Basin ecoregion (ADEC 2024). The inlet is 370 kilometers long and drains southward to the Gulf of Alaska (Jones et al. 2020); it is bordered by 1,350 kilometers of coastline and covers an area of roughly 20,000 square kilometers (km^2) (Rugh et al. 2000). Cook Inlet is larger than most partially enclosed marine waterbodies in the U.S., including Chesapeake Bay, San Francisco Bay, and Puget Sound.[6] Water depth in Cook Inlet increases from north to south; upper Cook Inlet is generally shallow, with most waters less than 73 meters deep (NMFS 2008a). Between Fire Island and the Forelands, the average water depth is approximately 18 meters (BOEM 2016). Near Anchorage and the action area, Cook Inlet branches into two shallow extensions: Knik Arm north of Anchorage and Turnagain Arm southeast of Anchorage. Both Knik and Turnagain arms are glacially formed estuaries fed by numerous rivers and creeks. **Figure 4-1** shows upper Cook Inlet, and Turnagain and Knik arms.

[6] https://www.fisheries.noaa.gov/resource/document/smooth-sheet-bathymetry-cook-inlet-alask; Accessed January 25, 2025.

Figure 4-1. Nautical Chart of Upper Cook Inlet, Knik, and Turnagain Arms



Source: National Oceanic and Atmospheric Administration (NOAA) Chart 16660 and Jacobs (2023).

The physical oceanography of Cook Inlet is characterized by complex circulation that varies at tidal, seasonal, annual, and interannual timescales (Musgrave and Statscewich 2006). The large tidal amplitude in this area exposes extensive mudflats in both Knik and Turnagain arms, the area between Anchorage and Fire Island, and along the other shorelines of upper Cook Inlet. **Section 4.1.1** provides additional information on the tides and currents of upper Cook Inlet.

Cook Inlet bathymetry is varied but mostly consists of shoals, canyons, and mudflats. In July 2022, a bathymetric survey was conducted within a 1,400-meter radius of the AWPCF outfall. The study showed the presence of rock ridges oriented north-south offshore of Point Woronzof with high concentrations of boulders and cobbles and a veneer of finer sediments, likely redistributed from nearby mudflats (Jacobs 2023). **Section 4.1.3** provides additional details on the substrate in the vicinity of the action area.

4.1.1 Tides and Currents

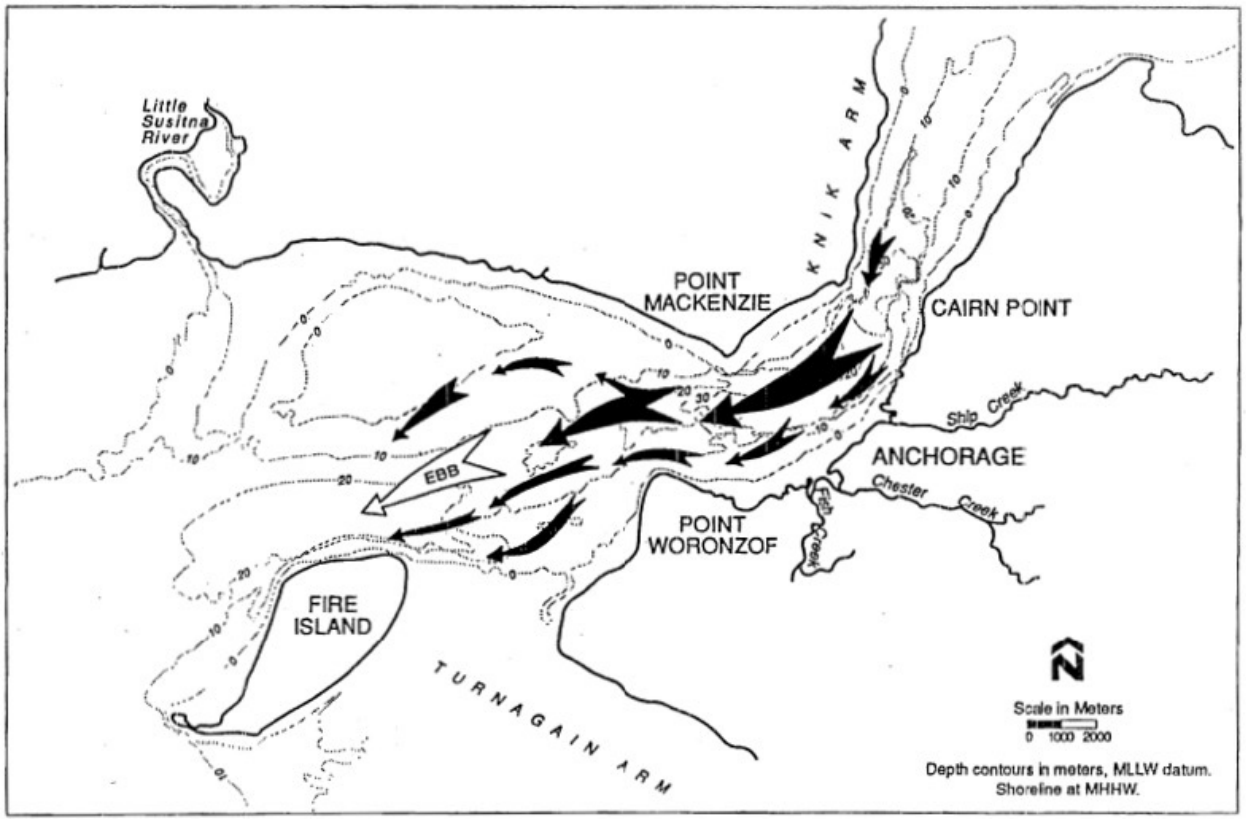
It is essential to understand the tidal and subtidal currents in Cook Inlet to determine and predict transport pathways that play a critical role in affecting the fate of introduced contaminants (Musgrave and Statscewich 2006). Tidal cycles in Cook Inlet are classified as mixed because they have strong diurnal and semi-diurnal components characterized by two unequal high and low tides occurring during a period of approximately 24 hours, with a period of approximately 6 hours between slack-water times (Musgrave and Statscewich 2006).

Upper Cook Inlet circulation patterns are driven by strong ebbing and flooding tides combined with freshwater input from numerous streams and rivers (BOEM 2016, 2021). Southward flows in upper western Cook Inlet result from the Coriolis effect acting on these freshwater inputs. Oey et al. (2007) modeled Cook Inlet baroclinic three-dimensional ocean circulation. The authors' model showed upwelling and downwelling cells with strong horizontal and vertical velocities within the central portion of Cook Inlet. These cells result from fronts produced by convergence of salt water from lower Cook Inlet through the deep center channel with fresh water from upper Cook Inlet (Oey et al. 2007). This convergence and divergence of different water masses (generally, southward-flowing low-salinity water and westward-intruding sea water) create strong rip tides in Cook Inlet (Haley et al. 2000, Johnson and Okkonen 1999). These strong frontal convergence zones are known as the West Rip, East Rip, and Middle Rip (Okkonen 2005).

The size, shape, and bathymetry of the Cook Inlet basin generate a funneling effect that, combined with tidal resonance, produces some of the highest tidal amplitudes in the world (Richardson and Schmalz 2012). These semi-diurnal tides amplify moving toward upper Cook Inlet and are the largest tidal ranges in U.S. coastal waters (Wang and Yang 2020), ranging from 4.9 meters near Seldovia in Kachemak Bay in lower Cook Inlet to 8.2 meters near Anchorage and the action area (Richardson and Schmalz 2012). This high tidal amplitude produces strong currents that dominate circulation patterns in the inlet and often exceed speeds of 3.5 meters per second (m/sec) (Musgrave and Statscewich 2006). In addition to tides and freshwater influx, geographic features influence currents in the vicinity of Point Woronzof (Jacobs 2023). Current velocities range from 0.5 m/sec (10th percentile) to 2 m/sec (90th percentile), with 1.4 m/sec as the 50th percentile velocity in the vicinity of the action area (Jacobs 2023). **Figures 4-2** and **4-3** illustrate the generalized current patterns in lower Knik Arm in the vicinity of Point Woronzof and the action area during ebb and flood tides, respectively. Tidal excursions, or the maximum distance that a parcel of water would transport during a full tidal cycle, are as high as 37 kilometers in upper Cook Inlet (Foster et al. 2010, Nelson and Whitney 1996).

Given the influence of these properties on water mixing in Cook Inlet, project-specific mixing zone modeling conducted in support of the NPDES permit is described in **Section 2.4**.

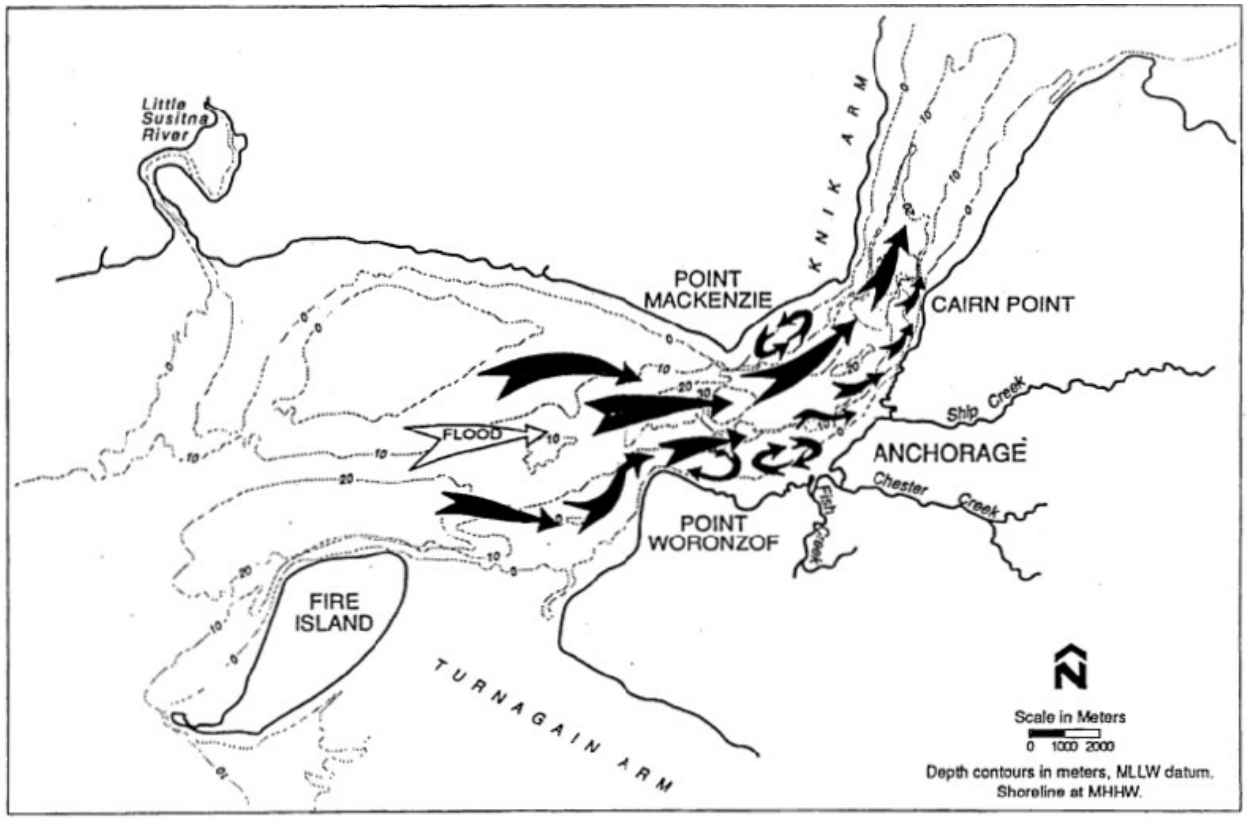
Figure 4-2. Generalized Upper Cook Inlet Current Patterns During Ebb Tide



Sources: Jacobs (2023) and CH2MHILL (2005)

Note: Size of current vector indicates relative strength of the tidal current.

Figure 4-3. Generalized Upper Cook Inlet Current Patterns During Flood Tide



Sources: Jacobs (2023) and CH2MHILL (2005)

Note: Size of current vector indicates relative strength of the tidal current.

4.1.2 Sea Ice

Sea ice is widespread throughout Cook inlet during winter, but the amount of cover varies annually and is not consistent throughout the inlet (BOEM 2016). The types of ice observed in Cook Inlet include pack ice, shorefast ice, stamukhi (layered ice cakes formed by stacking of ice floes on shorefast ice over multiple high tides), and estuarine/river ice (Brower et al. 1988, Mulherin et al. 2001, Parker and Jacobs 2018).

Ice formation in upper Cook Inlet waters is driven by air temperature, whereas sea ice in lower Cook Inlet is also influenced by the inflow rate of the Alaska Coastal Current (Shelden et al. 2014). As ice begins to form in the inlet, the tidal cycle creates a concentration effect where large slabs, or pans, of ice travel up and down the inlet; these ice pans can move as much as 8 kilometers per day (Parker and Jacobs 2018). Tidal action and related strong currents also often shatter sea ice already formed in Cook Inlet such that uniform ice cover is rarely observed (BOEM 2016). Drifting sea ice tends to collect along tide rip fronts and convergence zones (Johnson 2008).

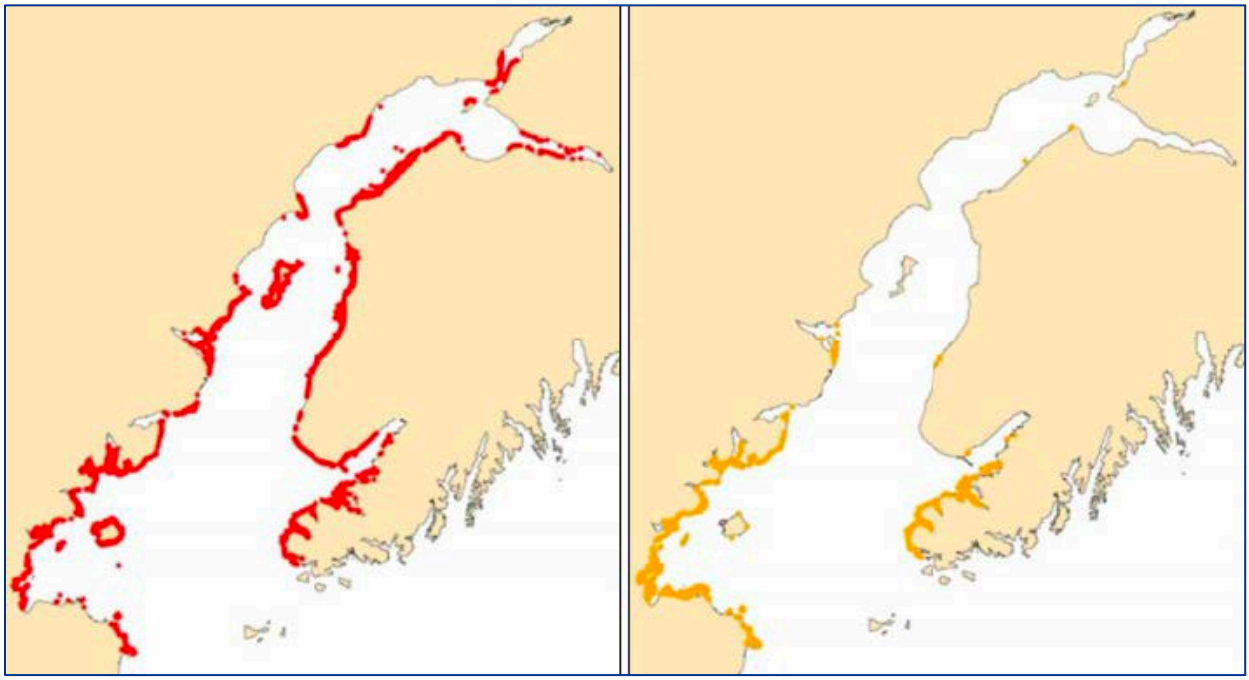
Seasonal sea ice has historically been observed in upper and central Cook Inlet areas from late December through March, with ice concentrations generally greatest in January and February (Johnson 2008). Eighty to 100% coverage by first year thin ice (< 70 centimeters thick) has historically been observed north of the Forelands from December until late March (Johnson and Okkonen 1999). Branch et al. (2021) documented maximum sea ice coverage in Cook Inlet in February, with the possibility of sea ice coverage in upper Cook Inlet in January, February, and March. Dense coastal sea ice, with less ice in the middle of

the inlet, was observed in December, April, and May; almost no sea ice was present in Cook Inlet from June until November (Branch et al. 2021).

4.1.3 Substrate

As shown in **Figure 4-4**, coastal rocky habitat is found in the immediate vicinity of Point Woronzof. Substrate in the vicinity of the action area is scoured by high currents and tidal flows (BOEM 2016), which do not allow suspended sediments to accumulate around the AWPCF outfall (Jacobs 2023). Subtidal surface sediment samples from both the AWPCF outfall vicinity and a control site near Point MacKenzie consisted of only cobbles; no fine-grained sediments were obtained from either sampling location (Jacobs 2023). The seabed in the vicinity of Point Woronzof and the action area is composed of coarse gravel, cobble, and rocks, which naturally armor the seabed and protect it from erosion by the swift tidal currents.

Figure 4-4. Coastal Rock Habitat of Cook Inlet (left) and Rocky Reefs of Cook Inlet (right)



Source: Zimmermam and Prescott (2014)

As described in Brabets et al. (1999), approximately 44 million metric tons of glacial and alluvial sediments are swept into Cook Inlet each year. The largest sediment load originates from the Susitna River, followed by the Knik and Matanuska rivers, although a substantial amount is also introduced by bluff erosion. Most of the load is transported during the high runoff period May through September. Suspended sediment in river discharges or urban runoff that makes its way to waters of the inlet brings along any adsorbed trace elements or contaminants (Brabets et al. 1999, Brabets and Whitman 2004).

Frenzel (2000) described the occurrence of organochlorine compounds, semi-volatile organic compounds (SVOCs), and trace elements in streambed sediments from 15 locations in the Cook Inlet Basin. At most sites, SVOCs and organochlorine compounds were either not detected or were detected at very low concentrations. Sediments from a developed location on Chester Creek in Anchorage had elevated concentrations of many SVOCs. Sediments from Moose Creek near Palmer, where there are extensive coal deposits in the watershed, showed low concentrations of numerous SVOCs. Low concentrations of SVOCs

were detected in sediments from the Deshka River and at Costello and Colorado Creeks; these three waterways are part of the Susitna River drainage. Isolated coal deposits exist in the parts of Denali National Park and Preserve where Costello and Colorado Creeks are located (Frenzel 2000).

Streambed sediments at six sites were analyzed for 32 organochlorine pesticides and polychlorinated biphenyls (PCBs). Hexachlorbenzenes (HCBs) were detected at a reportable concentration at only one location, the Talkeetna River, which is also part of the Susitna River drainage (Frenzel 2000). The concentration detected was well below levels considered to be toxic. The author also documented elevated concentrations of cadmium, lead, and zinc in samples collected at Chester Creek, likely related to the degree of development in that watershed.

Frenzel (2002) described the analysis of priority-pollutant trace element concentrations in 48 streambed sediment samples collected from 47 sites in the Cook Inlet Basin during the period 1998 to 2000. Concentrations of arsenic, chromium, mercury, and nickel in Cook Inlet Basin streambed sediments were elevated relative to reference sites in the contiguous U.S. using identical methods (Frenzel 2002). Chromium and nickel concentrations were highest in the Denali area, while mercury concentrations were highest in the Lake Clark National Park and Preserve on the western side of lower Cook Inlet and in the MOA. Concentrations of cadmium, lead, and zinc were highest at the most urbanized site in Anchorage and at two sites downstream from an ore body in Lake Clark National Park and Preserve (Frenzel 2002). The author noted that potential toxicity of the sediments is influenced by sediment particle size, with smaller particle size resulting in higher metal content. There are very small amounts of fine-grained sediment present in the streambeds of the Cook Inlet Basin.

Chemical analyses of sediments dredged from Cook Inlet were summarized by NMFS (2022c); all contaminants analyzed were less than management levels and some were less than detection limits. BOEM (2016) noted that hydrocarbon concentrations in Cook Inlet sediments are not highly elevated and are comparable to values reported for background hydrocarbons in other Alaska offshore coastal waters. Analyses of intertidal sediment samples summarized by Jacobs (2023) showed no evidence of outfall impacts to sediment chemistry. Data from samples collected near the AWPCF outfall and at a control site across the inlet at Point MacKenzie showed similar physical and chemical composition (Jacobs 2023).

4.2 Water Quality

The strong tidal currents described in **Section 4.1.1** suspend large volumes of sediment from the Matanuska and Knik rivers. As a result, the upper inlet is a highly turbid environment (BOEM 2016). These tidal forces also have a strong influence on salinity gradients in the inlet (BOEM 2016). The general circulation patterns described in **Section 4.1.1** create flows of denser, saltier water moving northward along the eastern shore of Cook Inlet and less salty but silty water moving southward along the inlet's western shore (BOEM 2016). In satellite images, freshwater flowing into upper Cook Inlet can be seen transporting sediments southward along the west side of the inlet (Foster et al. 2010). Based on these circulation patterns and the influx of freshwater in the upper inlet, it is not surprising that the salinity of Cook Inlet waters varies significantly moving from north to south (Foster et al. 2010). Values as low as 10 parts per trillion (ppt) have been measured at the surface in upper Cook Inlet (Smith 1993) and as high as 32 ppt near the mouth of the Inlet (Okkonen et al. 2009, Smith 1993).

The total average annual freshwater discharge into Cook Inlet is estimated to be 3,285 m^3/sec (Brabets et al. 1999). The largest input to Cook Inlet is from the Susitna River Basin, which accounts for approximately 47% of the annual total, or approximately 1,530 m^3/sec (Brabets et al. 1999). The quality of this surface water input to upper Cook Inlet waters is affected by both natural and anthropogenic factors, which include runoff from urban areas, timber-harvested areas, mining, and accelerated bank erosion from intense recreational use (Brabets and Whitman 2004).

The Cook Inlet region is the most populated and industrialized region of the State of Alaska. Cook Inlet waters receive urban stormwater runoff, effluent from 10 municipal sewage treatment plants, spills of oil and other chemicals, runoff from airport deicing, spills and runoff from military training activities at Eagle Bay, fish processing wastes, discharges from oil and gas activities (drilling muds and cuttings, produced water, treated sewage effluent discharge, and deck drainage), and other regulated discharges (Moore et al. 2000, NMFS 2008a, 2022c). According to the ADEC spill search webpage,[7] since 2014 in the region ADEC refers to as North Cook Inlet, there have been 10 reportable spills of crude oil and 34 reportable spills of noncrude oil, each type with an average volume of 21 gallons. Permitted discharges into Cook Inlet are regulated by either the EPA or ADEC, which may authorize certain discharges under the NPDES/Alaska Pollution Discharge Elimination System (APDES) (Section 402 of the CWA of 1972).

Chemical analyses of Cook Inlet water samples summarized in NMFS (2022c) showed that contaminants analyzed were below regulatory levels, and some were below detection limits. For AWPCF-specific water quality and biological monitoring results, refer to **Section 4.2**. Brabets and Whitman (2004) summarized water quality data from eight fixed sampling sites in streams and rivers that drain into the Cook Inlet Basin during the period 1997 to 2001 as part of the National Water Quality Assessment Program (NAWQA), which began in 1991. The goal of the NAWQA was to collect multiple years of chemical, biological, and physical data to understand the water quality and biological conditions of water bodies across the U.S. The data summarized in Brabets and Whitman (2004) provide useful historical context for the overall conditions of Cook Inlet during that time period. Of the water quality constituents sampled in 1998 to 2001, all concentrations were detected at levels lower than drinking water standards.

Chester Creek is an urbanized stream that drains from within the MOA into upper Cook Inlet. Chester Creek water quality samples collected from a location near Arctic Boulevard had the highest concentrations of calcium, magnesium, chloride, and sodium, likely from the use of deicing materials during the winter (Brabets and Whitman 2004). Of 88 volatile organic compounds (VOCs) tested for in the Chester Creek samples, 10 compounds were detected in 1999. Five pesticides were also detected in water samples from Chester Creek at levels higher than laboratory reporting limits during the reporting period (1998 to 2001). Only the insecticide carbaryl was detected at a concentration that exceeded aquatic-life standards. Carbaryl has been used in Anchorage as an insecticide to treat spruce bark beetles. Of the human activities occurring in the Cook Inlet region (high recreational use, logging, and urbanization), urbanization in particular was noted to have had a measurable effect on water quality in Cook Inlet Basin drainages (Brabets and Whitman 2004) based on: (1) the low percentage of macroinvertebrates present in Chester Creek samples; (2) water quality data indicating the presence of pesticides, insecticides and VOCs; and (3) comparatively[8] higher water temperatures in Chester Creek, particularly during summer months (Brabets and Whitman 2004).

In the State of Alaska's 2014 to 2016 Final Integrated Water Quality Monitoring and Assessment Report, upper Cook Inlet is designated as Category 3 in the CWA Section 303(d) list of impaired water bodies, indicating there are insufficient data to determine whether the water quality standards for any designated uses are attained (ADEC 2018). The 2022 Integrated Report made no changes to this designation (ADEC 2022a). In July 2024, ADEC published a summary of the 2024 Draft Integrated Report, including a table of the waterbodies for which a change in designation has been determined. Based on the data available on

[7] https://dec.alaska.gov/Applications/SPAR/PublicMVC/PERP/SpillSearch?Spill_DateFrom=&Spill_DateTo=3%2F10%2F2025&Spill_Area=2&Spill_Subarea=4&Spill_Region=21&Spill_Location=362&Spill_SubstanceType=&Spill_Substance=&Spill_CauseType=&Spill_Cause=&Spill_Number=&Spill_SearchButton=Search&Search_Type=Facility&Facility_FacilityName=&Facility_Address=&Facility_City=&Facility_ZipCode=&Facility_FacilityType=&Affiliate_CompanyName=&Affiliate_ContactName=; Accessed March 10, 2025.

[8] Compared to water samples from Campbell Creek during that same period 1998 – 2001, which was characterized as relatively undeveloped by comparison (Brabets and Whitman 2004).

the ADEC website,[9] upper Cook Inlet is still listed as Category 3, although designations for several tributaries in the MOA have changed. For example, Ship Creek, Westchester Lagoon, Chester Creek, and Campbell Creek are listed as Category 4A for fecal coliform, which is applied to waterbodies with an approved total maximum daily load.

4.2.1 General Water and Sediment Chemistry

To fulfill requirements of the NPDES Permit AK-002255-1, AWPCF conducts an annual effluent monitoring program that includes daily, weekly, monthly, and annual monitoring requirements depending on the parameter, as described in **Section 2.2** of this BE. The 2023 monitoring program results are referenced in this section to characterize general chemistry parameters for the effects analysis. Where applicable, results for water, sediment and fish tissue sampling efforts are summarized. **Table 4-1** compares the effluent discharge concentrations (referred to as Discharge Monitoring Report [DMR] data) for general chemistry constituents in AWPCF effluent in 2023 to the existing permit limits and Alaska State Marine Water Quality Standards (ADEC 2022c) and national recommended water quality standards (NRWQC) as promulgated under the CWA, where applicable. Current NPDES permit limitations (EPA 2000) are also shown in the table (refer to the second to last column of **Table 4-1**).

Table 4-2 summarizes general chemistry constituents in AWPCF effluent, ZID nearfield, and control surface water sample locations in 2023; all hydrographic water quality data collected for monitoring purpose and figures depicting all hydrographic sample locations in upper Cook Inlet are summarized in Kinnetic Environmental Inc. (2024a). **Section 6.1** discusses the effects of AWPCF effluent on general chemistry parameters and the potential effects of changes to these parameters on ESA-listed species and their prey in upper Cook Inlet.

[9] https://dec.alaska.gov/water/water-quality/integrated-report; Accessed January 26, 2025.

Table 4-1. General Chemistry Constituents as Detected in AWPCF Effluent 2023

Parameter Description	Units	2023 Effluent Discharge (DMR) Concentrations (monthly average)[a]			Existing Permit Limits[b]	State of Alaska Marine Water Quality Standards[c] or Criteria[d]	National Recommended Water Quality Criteria[g] Under the CWA
		Minimum Value	Maximum Value	Annual Average			
Total Suspended Solids (TSS)	milligrams per liter (mg/L)	59	72	65	170 (monthly avg) 180 (weekly avg) 190 (daily avg)	Standards are set for turbidity at 25 nephelometric turbidity units (NTU).	"Conventional pollutant" under CWA; no NRWQC. States must adopt criteria.
Dissolved Oxygen (DO)	mg/L	1.9	3.7	2.7	NA	In surface coastal waters not <6.0 mg/L at 1 meter and not <4.0 mg/L at any depth. In estuaries and tidal tributaries <5.0 mg/L. May never be >17 mg/L.	"Conventional pollutant" under CWA[e]; no NRWQC. States must adopt criteria.
Biochemical Oxygen Demand (BOD)	mg/L	149	175	158	240 (monthly avg) 250 (weekly avg) 300 (daily avg)	NA	"Conventional pollutant" under CWA[e]; no NRWQC. States must adopt criteria.
Temperature	Degrees Celsius (°C)	10.4	15	12.3	NA	Weekly average may not increase by >1°C. Max rate of change may not be >0.5°C	State must establish criteria (species dependent). EPA can review and approve or disapprove such standards.
Total Residual Chlorine (TRC)	mg/L or µg/L	0.26	0.33	0.29	1.2 (max daily limit)	Acute (CMC[f]) 13 µg/L (1-hr avg); Chronic (CCC[f]) 7.5 µg/L (4-day avg).	Saltwater acute (CMC) 13 µg/L. Saltwater Chronic (CCC) 7.5 µg/L[g]

Parameter Description	Units	2023 Effluent Discharge (DMR) Concentrations (monthly average)[a]			Existing Permit Limits[b]	State of Alaska Marine Water Quality Standards[c] or Criteria[d]	National Recommended Water Quality Criteria[g] Under the CWA
		Minimum Value	Maximum Value	Annual Average			
Ammonia[h]	milligrams of nitrogen per liter (mg-N/L)	19.7	33.0	25.8	Acute MAEC[a]: 1,466 Chronic MAEC[a]: 217 Monthly max[a]: 33	CMC for 5°C, pH 7 and salinity 30 practical salinity unit is 171.3 mg-N/L. CCC under the same conditions is 25.5 mg-N/L.	No NRWQC for ammonia.
pH	-	6.8 - 7.0	7.2 - 7.6	6.8 - 7.6	NA	Must be between 6.0 and 8.5; may not vary more than 0.2 from naturally occurring range.	"Conventional pollutant" under CWA[e]; no NRWQC. States must adopt criteria.
Fecal Coliform (FC)	FC/100 milliliters (ml)	2.8	7.8	4.6	850 colonies/ 100 ml (monthly avg)[i]	The most stringent standards are for harvesting raw mollusks or other raw aquatic life. FC may not exceed 14/100 ml (geometric mean).	"Conventional pollutant" under CWA; no NRWQC. States must adopt criteria.

[a] Source: Kinnetic Environmental Inc. (2024a).

[b] Source: EPA (2000)

[c] ADEC (2022c) (ADEC 2025). Values quoted are for the most protective use category. Note that Alaska Water Quality Standards (AWQS) must be equal to or more stringent than any National Recommended Water Quality Criteria (NRWQC) promulgated by the CWA. In the absence of NRWQC for a given effluent constituent, the EPA will review the proposed state standard and accept or reject it.

[d] Source: ADEC (2022b).

[e] Clean Water Act Section 304(a)(4).

[f] CMC - criterion maximum concentration; CCC – criterion continuous concentration

[g] Source: https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#:~:text=The%20CCC%20of%2020mg/L,mg/L%20whichever%20is%20higher. Accessed March 7, 2025. Ammonia and chlorine are considered to be toxic or deleterious substances.

[h] Alaska Water Quality Criteria for ammonia are dependent on receiving water pH, salinity, and temperature. Refer to Appendices F and G of ADEC (2022b) for criteria under different conditions.

[i] Geometric mean of at least five samples. Not more than 10% of the samples shall exceed 2,600 FC most probable number of microorganisms per milliliter.

avg = average
MAEC = maximum allowable effluent concentration
NA = not applicable

Table 4-2. General Chemistry Components, Surface Receiving Water Samples, June 2023

Parameter Description	Control (C1-1S)	Outfall (F1-1S)	ZID Boundary (F1-2S)	Nearfield (F1-3S)
Temperature °C	12.17	11.52	11.54	11.59
Salinity (psu)	12.72	14.10	14.07	14.04
pH (SU)	7.86	7.86	7.84	7.85
DO (mg/L)	9.37	9.44	9.48	9.57
Turbidity (NTU)	73	357	340	260
Color (units)	2.5	10	2.5	2.5
TRC (mg/L)	<0.01	0.018	<0.01	<0.01
Fecal Coliform (FC/100 ml)	<1.8	2.0	2.0	1.8

Source: Kinnetic Environmental Inc. (2024a)

Note: Control C1-1S sample site is located across Cook Inlet from the outfall. The nearfield sampling location F1-3S is located approximately 1,400 meters from the outfall (Kinnetic Environmental Inc. 2024a).

4.2.1.1 Turbidity and Total Suspended Solids

As shown in **Table 4-1**, mean monthly TSS concentrations in the effluent for 2023 were reported as an annual average of 65 mg/L (range 59 to 72 mg/L), well below current permit limits of 170 mg/L for the monthly average and 190 mg/L for the daily maximum. As expected, turbidity of the receiving waters is variable given the typical environmental conditions, currents, and glacial sediment input of upper Cook Inlet (**Table 4-2**). Turbidity did not exceed natural conditions and color did not exceed 5 color units at any receiving water station other than at the outfall during low slack tide (Kinnetic Environmental Inc. 2024a).

4.2.1.2 Dissolved Oxygen and Biochemical Oxygen Demand

Maximum levels of BOD in 2023 were well below permit limits of 300 mg/L daily maximum, 250 mg/L weekly average, and 240 mg/L monthly average for AWPCF (**Table 4-2**). The annual average BOD from AWPCF in 2023 was 158 mg/L. DO did not vary more than 0.2 mg/L among receiving water samples collected in June of 2023.

4.2.1.3 Temperature

Temperature is not a regulated condition of the current effluent discharge permit for AWPCF. **Table 4-1** shows AWPCF effluent discharge temperatures for 2023, which ranged from 10.4 to 15.0°C (annual average 12.3°C). The 2022 Mixing Zone Study also reported a temperature at the AWPCF outfall of 14.0°C (Jacobs 2023).

Water temperatures in Cook Inlet vary considerably depending on location, depth, freshwater inputs, extent of ice formation, upwellings, and currents. Seasonal variability in nearshore surface temperatures is common. The average water temperature in Cook Inlet in winter is approximately 2°C and in spring 2.6°C. During the summer months, average water temperature in Cook Inlet rises to approximately 10.8°C, and in

autumn averages approximately 8.6°C.[10] Within the action area near Point Woronzof, average water temperature November through June (dry season) was 5°C whereas for the wet season (July through October) the average temperature was 12°C (Jacobs 2023). **Table 4-2** shows the monitoring results for temperature at selected control, outfall, ZID boundary, and nearfield stations in upper Cook Inlet. Other control stations summarized in Kinnetic Environmental Inc. (2024a) showed higher temperatures but these statistical differences in water temperature recorded between nearfield and control stations were not ascribed to the outfall; rather, these temperatures were caused by higher riverine input at the control stations (Kinnetic Environmental Inc. 2024a). While there may be specific point locations where water temperature of the effluent is higher than receiving water temperature, this only occurs at certain times of year (Kinnetic Environmental Inc. 2024a).

4.2.1.4 Total Residual Chlorine

Chlorine does not bioconcentrate and, as shown in **Table 4-1**, AWQS for TRC are met within the proposed 350-meter mixing zone (the ZID) in the action area. In 2023, TRC concentrations in AWPCF effluent did not exceed permit limits of 1.2 mg/L for the entire year, the maximum daily value of 0.808 mg/L or monthly maximum daily range of 0.453 to 0.808 mg/L (Kinnetic Environmental Inc. 2024a). The monthly average effluent TRC concentration ranged from 0.26 mg/L in February to 0.33 mg/L in July, with an overall annual average of 0.29 mg/L. As shown in **Table 4-1**, the existing AWPCF permit limit for TRC is a daily maximum of 1.2 mg/L. The marine AWQS for acute and chronic effects are 13 µg/L (0.013 mg/L) and 7.5 µg/L (0.0075 mg/L), respectively. TRC was detected at one receiving water sample location in 2023 at 0.018 mg/L, slightly over the method detection limit (MDL) of 0.01 mg/L (**Table 4-2**). This location was situated directly over the outfall and the sample was collected at low slack tide (Kinnetic Environmental Inc. 2024a).

4.2.1.5 Ammonia

In 2023, monthly values for total ammonia in AWPCF effluent ranged from 19.7 to 33.0 mg/L, with a yearly average of 25.8 mg/L (**Table 4-1**), similar to values observed historically (Kinnetic Environmental Inc. 2024a). The maximum allowable effluent concentration (MAEC), assuming a dilution of 142:1 specified in the permit, for ammonia is 1,466 mg/L for acute effects and 217 mg/L for chronic effects; the monthly maximum in AWPCF effluent in 2023 was 33 mg/L (Kinnetic Environmental Inc. 2024a), which is well below the calculated effluent limit. Although aquatic organisms are generally able to metabolize ammonia without effects, elevated concentrations are highly toxic to some fish and invertebrate species.

4.2.1.6 pH

To protect marine and estuarine organisms, the State of Alaska has set a pH standard for marine waters between 6.0 and 8.5, which may not vary more than 0.2 from the natural range (ADEC 2022c). As shown in **Table 4-1**, effluent from AWPCF is within this range (approximately 7.8).

4.2.1.7 Fecal Coliform and Other Bacteria

The AWPCF NPDES permit requires that the effluent does not exceed 850 FC/100 ml on a monthly average (geometric mean) (EPA 2000). The 2023 field sampling results for fecal coliform concentrations in Cook Inlet receiving water samples and intertidal samples met the most restrictive AWQS criteria at all stations, including those located within the proposed 350-meter mixing zone (the ZID) boundary (Kinnetic

[10] https://seatemperature.info/cook-inlet-water-temperature.html#google_vignette. Accessed May 27, 2024

Environmental Inc. 2024a). AWPCF effluent fecal coliform ranged between 2.8 to 7.8 FC/100 ml in 2023, which was at least two orders of magnitude below the permit limit and below the most stringent AWQS for marine waters of 14/100 ml (geometric mean) ADEC (2022c). In recent years, AWPCF has been effective at removing fecal coliform bacteria because of improvements in chlorine disinfection of the effluent (Kinnetic Environmental Inc. 2024a). As shown in **Table 4-2**, fecal coliform concentrations in receiving water samples met the most restrictive AWQS criteria, including stations located within the proposed 350-meter mixing zone boundary. As noted in **Table 4-1**, there are no NRWQC for fecal coliform.

4.2.2 Metals

There are no permit limits for metals or cyanide; however, the NPDES permit requires that effluent be sampled for arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, silver, and zinc and that each concentration must be reported as total and dissolved. As part of the annual effluent monitoring program and in compliance with the existing NPDES permit, AWPCF analyzes the concentrations of these metals and total cyanide in both effluent and receiving water samples. In addition, AWPCF analyzes effluent samples for antimony, beryllium, selenium, and thallium (Kinnetic Environmental Inc. 2024a). Sampling for these four metals is not conducted in receiving waters and their concentrations in the effluent are orders of magnitude below calculated MAECs. Nonetheless, antimony, beryllium, selenium, and thallium were included in the ecological risk evaluation described in **Section 6** and **Appendix C** of this BE.

Table 4-3 compares dissolved concentrations in receiving waters for nine metals and total cyanide in AWPCF effluent to State of Alaska upper Cook Inlet SSWQC (ADEC 2022c) and MAECs during the period 2019 to 2023. Water quality standards and the MAECs are shown in bold in the far right column in **Table 4-3**. Except for cadmium, these standards are equal to, or as in the case of mercury, more stringent than the NRWQC for saltwater.[11] For cadmium, the SSWQC are 9.3 µg/L for chronic exposures and 42 µg/L for acute exposure (refer to **Table 4-3**). However, the chronic and acute NRWQC for cadmium are 7.9 µg/L and 33 µg/L, respectively. The NRWQC for mercury is 0.94 µg/L but includes a caution that it might not be adequately protective of rainbow trout and coho salmon. Therefore, as shown in **Table 4-3**, the State of Alaska has set a more stringent chronic SSWQC of 0.025 µg/L for mercury (ADEC 2022c). Also, as shown in **Table 4-3**, the State of Alaska has not set SSWQC for cyanide (ADEC 2022c). The NRWQC for free cyanide in saltwater is 1 µg/L for both chronic and acute effects and is used to represent a stringent standard for comparison to total cyanide.[9]

Data from a control station located across Cook Inlet near Point MacKenzie are highlighted in orange in the table. In support of a leachate study conducted for the current permitting effort, **Table 4-4** summarizes the concentrations of these nine metals and total cyanide in AWPCF effluent collected in June (Kinnetic Environmental Inc. 2024d). **Table 4-5** compares maximum dissolved metals and free cyanide concentrations during the period 2017 to 2022 to background receiving water concentrations measured near Pt. MacKenzie (Jacobs 2023).

During the period 2019 to 2023, with the exception of copper, dissolved metals in the effluent at all stations were below the SSWQC in all samples collected (**Table 4-3**). Note that dissolved metals data from 2022 were all found to be substantially elevated when compared to historic values and were flagged as a problem with the field filtration cartridges that were used that year, so those data were excluded from the analysis (Kinnetic Environmental Inc. 2023). In 2019, 2020, and 2023, dissolved copper in the samples

[11] https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#:~:text=The%20CCC%20of%2020mg/L,mg/L%20whichever%20is%20higher Accessed March 9. 2025

collected directly over the outfall (3.17, 6.16, and 3.75 µg/L, respectively) were slightly higher than the AWQS value of 3.1 µg/L; however, concentrations at the ZID boundary, nearfield, and control stations were all less than AWQS except for one anomalously high value that was seen at the nearfield location that was flagged as a potential error (Kinnetic Environmental Inc. 2024a). Section 6.1.2 summarizes the results of the risk evaluation for a subset of the nine metals and total cyanide to assess potential effects on Cook Inlet beluga whales, Steller sea lions, and their prey. Based on sampling results and the potential to bioaccumulate in aquatic species, only some metals (namely, copper, zinc, and silver) in AWPCF discharge were evaluated for potential risk.

AWPCF sampling in 2022 and 2023 provided site-specific information on metals concentrations in sediments from four subtidal and six intertidal locations (Kinnetic Environmental Inc. 2024f). Most metals were low, with no evidence of accumulation. Differences in concentrations observed between sample location and field replicate analyses were likely caused by differences in physical characteristics of the sediment. The highest concentrations of arsenic (17.6 milligrams per kilogram [mg/kg]), copper (50.9 mg/kg), and nickel (42.2 mg/kg) were detected in sediment samples from Station IT-1 (located approximately 250 meters west of the Postmark Drive stormwater discharge from Ted Stevens Anchorage Internation Airport [AIA]) and at control Station IT-C (arsenic 14.9 mg/kg; copper 41.6 mg/kg; nickel 34.9 mg/kg) located near Point MacKenzie, directly across Cook Inlet from the outfall); all of these sites also had the highest silt/clay content. Overall, with the exception of mercury, the highest metals concentrations were detected at Station IT-1 (Kinnetic Environmental Inc. 2024f).

In addition, the levels of dissolved mercury detected were lower than the NRWQC of 0.94 µg/L.[12] As discussed previously and shown in **Table 4-3**, to protect rainbow trout and coho salmon, the State of Alaska has set lower SSWQC for mercury of 0.025 µg/L and 1.8 µg/L for chronic and acute exposures, respectively. **Table 4-3** shows that these more stringent criteria were met in all receiving water samples.

[12] https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#:~:text=The%20CCC%20of%2020mg/L,mg/L%20whichever%20is%20higher. Accessed March 9, 2025.

Table 4-3. Concentrations of Nine Metals (Dissolved) and Total Cyanide in AWPCF Receiving Water Samples

Component	Maximum Receiving Water Concentrations µg/L[a], [b]																				MAEC (µg/L)[c]	Site-Specific Receiving Water Quality Criteria (SSWQC) for Upper Cook Inlet in the vicinity of Pt. Woronzof (µg/L)[d]	
	2019				2020				2021				2022				2023					Chronic	Acute
	Control (C1-1S)	Outfall (F1-1S)	ZID Boundary (F1-2S)	Nearfield (F1-3S)	Control (C1-1S)	Outfall (F1-1S)	ZID Boundary (F1-2S)	Nearfield (F1-3S)	Control (C1-1S)	Outfall (F1-1S)	ZID Boundary (F1-2S)	Nearfield (F1-3S)	Control (C1-1S)	Outfall (F1-1S)	ZID Boundary (F1-2S)	Nearfield (F1-3S)	Control (C1-1S)	Outfall (F1-1S)	ZID Boundary (F1-2S)	Nearfield (F1-3S)			
Arsenic	1.27	1.43	1.48	1.36	0.98	2.1	0.972	1.05	1.29	1.52	1.5	1.28	2.53	2.54	3.52	2.19	1.88	1.88	1.77	1.77	4,882	36	69
Cadmium[e]	0.049	0.059	0.055	0.056	0.038	0.087	0.045	0.042	0.025	0.095	0.108	0.106	*0.072*	*0.070*	*0.090*	*0.063*	0.0715	0.0810	0.0750	0.0788	1,322	9.3	42
Chromium (VI)	0.124	0.137	0.135	0.14	*0.098*	0.143	*0.085*	0.108	0.105	0.132	0.118	*0.086*	*3.30*	*2.30*	*4.56*	*1.94*	<0.170	<0.170	<0.170	<0.170	7,038	50	1,100
Copper	1.05	3.17	1.54	1.22	0.79	6.16	0.94	0.96	0.99	2.15	1.24	1.05	3.69	4.17	5.81	2.9	1.89	3.75	2.07	20.8[f]	317	3.1	4.8
Lead	*0.014*	0.052	*0.007*	*0.011*	0.022	0.04	*0.006*	*0.007*	*0.008*	*0.11*	<0.005	<0.005	0.513	0.335	0.94	0.25	0.458	0.0400	0.1020	0.2030	1,140	8.1	210
Mercury[g]	*0.0002*	0.0005	0.0002	0.0002	*0.0003*	*0.0004*	*0.0002*	*0.0002*	*0.0003*	*0.0002*	*0.0002*	*0.0002*	0.0025	0.0078	0.0313	0.0287	*0.0004*	0.0010	0.0004	0.0004	2.73	0.025	1.8
Nickel	0.723	0.628	0.818	0.616	0.622	0.898	0.793	0.722	*0.684*	*0.904*	*0.773*	*0.593*	*3.39*	*2.89*	4.71	*2.31*	*1.33*	1.29	1.51	1.69	978	8.2	74
Selenium	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	71	290
Silver	<0.017	<0.017	<0.017	<0.017	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.019	<0.050	<0.050	<0.050	<0.050	<0.050	*0.017*	<0.050	<0.050	257	-	1.9
Zinc	*0.38*	4.54	*0.065*	0.71	<0.35	3.74	<0.35	<0.35	<0.60	*1.10*	<0.60	<0.60	<7.00	7.00	*9.19*	<7.00	1.17	3.97	1.70	2.4	11,249	81	90
Total Cyanide[h]	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.34	<0.9	<0.9	<0.9	<0.9	<0.9	*4.7*	<0.9	<0.9	<0.5	*7.9*	<0.5	<0.5	181	NA	NA

Note: Concentrations in italics indicate that these metals were detected at levels below the method reporting limit (MRL) and, thus, are estimated values. Concentrations indicated as "<" are below the laboratory MDL.

NR = Not reported

[a] Source: Kinnetic Environmental Inc. (2020, 2021, 2022, 2023a, 2024a).

[b] Control CS-1S sample site is located across Cook Inlet from the outfall. The nearfield sampling location F1-3S is located approximately 1,400 meters from the outfall (Kinnetic Environmental Inc. 2024a).

[c] For conservative substances, effluent water quality criteria were determined by assuming a dilution of 142:1 at the ID boundary, where: MAEC = 142 * (Criteria - Natural Background Concentration) + Criteria. For nonconservative substances, a dilution of 180:1 was utilized in the MAEC calculation (Kinnetic Environmental Inc. 2024a).

[d] Source: ADEC (2022c); measured as dissolved metal. These SSWQC are for upper Cook Inlet in the vicinity of Point Woronzof, an area bounded by the constriction of Knik Arm at Cairn Point to the northeast, by the southern shoreline of Cook Inlet southwest to Point Campbell, by a line from Point Campbell to the northeast end of Fire Island, by a line due north from the northeast end of Fire Island to the northern shoreline of Cook Inlet at a point east of the mouth of the Little Susitna River, by the northern shoreline of upper Cook Inlet north and east to a point directly west of Cairn Point; and from that point by a line due east to Cairn Point.

[e] NRWQC under the CWA for cadmium are more stringent than the SSWQC set by the State of Alaska and shown in the far right column of this table. The saltwater NRWQC are 7.9 µg/L and 33 µg/L for chronic and acute exposures, respectively. All receiving water samples collected met these standards.

[f] Outlier may be from a filtration failure because the other dissolved copper measured in receiving water was 2.07 µg/L or less in 2023 (Kinnetic Environmental Inc. 2024a).

[g] The NRWQC for mercury is 0.94 µg/L but includes a caution that it might not be adequately protective of rainbow trout and coho salmon. Therefore, as shown in Table 4-3 the State of Alaska has set a more stringent chronic SSWQC of 0.025 µg/L for mercury (ADEC 2022c).

[h] The NRWQC for free cyanide saltwater is 1 µg/L for both chronic and acute effects.

Determining cyanide concentrations in seawater samples is prone to interference, particularly when testing at very low concentrations (Kinnetic Environmental Inc. 2024a). As shown in **Table 4-3**, with the exception of samples collected at the outfall in 2022 and 2023, free and total cyanide concentrations were below the MDL. The 2022 and 2023 concentrations (4.7 and 7.9 µg/L, respectively) were below the method reporting limit (MRL) and are estimated values (Kinnetic Environmental Inc. 2023a, 2024a). Total cyanide was also reported below MRL in 2023 effluent samples (Kinnetic Environmental Inc. 2024d). **Section 6** provides an analysis of the potential effects of AWPCF effluent on ESA-listed species and their prey in upper Cook Inlet. A discussion and summary of the current literature regarding potential effects of metals and cyanide on aquatic species is presented in **Appendix F**.

Table 4-4. Total Metals and Cyanide Concentrations Detected in AWPCF Effluent in June 2023

Parameter	Total Concentration (µg/L)
Arsenic	2.33
Cadmium	0.151
Chromium	1.55
Copper	34.5
Lead	1.26
Mercury	0.0200
Nickel	3.93
Silver	0.163
Zinc	109
Cyanide (free)	ND[a]
Cyanide (total)	0.6[b]

Source: Kinnetic Environmental Inc. (2024d)

[a] Not detected at MDL.

[b] Estimated concentration below the MRL.

Table 4-5. Maximum Dissolved Metals and Free Cyanide Concentrations in Effluent 2017-2022 Compared to Background Receiving Waters

Parameter	Maximum Concentration in Effluent (µg/L)	Background Concentration of Receiving Waters (µg/L)
Arsenic	2.8	1.57
Cadmium	6.2	0.092
Chromium	3.6	0.26
Copper	60.8	1.53
Lead	1.54	0.028
Mercury	0.114	0.00045
Nickel	9.5	1.34
Silver	0.42	0.052
Zinc	124	4.12

Parameter	Maximum Concentration in Effluent (µg/L)	Background Concentration of Receiving Waters (µg/L)
Cyanide (free)	9.0	ND

Source: Jacobs (2023)
ND = no data available for background receiving water.

4.2.3 Organic Compounds

4.2.3.1 Total Aromatic Hydrocarbons

The AWQS (ADEC 2022c) define total aromatic hydrocarbons (TAHs) as the sum of the concentrations of individual, extremely volatile, monoaromatic hydrocarbon compounds, including benzene, ethylbenzene, toluene, and total xylenes (BTEX); they are often referred to as VOCs. Total aqueous hydrocarbons (TAqH) are composed of polycyclic aromatic hydrocarbons (PAHs) (refer to **Section 6.1.1**) and BTEX (NMFS 2019a). As defined in the AWQS (ADEC 2022c), TAqHs are "those collective dissolved and water-accommodated monoaromatic and polynuclear aromatic petroleum hydrocarbons that are persistent in the water column…". TAH and TAqH do not include floating surface oil or grease. Concentrations of these compounds in Cook Inlet waters are typically associated with oil and gas facilities or activities (NMFS 2019a).

In 2023, effluent TAH concentrations were significantly less than their maximum allowable limits (that is, MAECs) of 1,810 µg/L, as calculated from AWQS and the mixing zone dilution credit (Kinnetic Environmental Inc. 2024a). Historic annual monitoring of the AWPCF discharge from 2019 to 2022 reported TAHs below the AWQS of 10 µg/L, except in 2020 when TAH concentrations were detected at levels greater than 10µg/L. There are no NRWQC for BTEX or any TAHs in marine waters.[13] The 2020 results may be associated with possible BTEX contamination from the skiff used during sampling (Kinnetic Environmental Inc. 2024a).

TAH concentrations in supplemental receiving water samples demonstrated that both TAH and TAqH met the AWQS at all locations and were not statistically different between the control and outfall stations. **Section 6** provides an analysis of the potential effects of AWPCF effluent on ESA-listed species and their prey in upper Cook Inlet. A discussion and summary of the current literature regarding potential effects of TAHs on aquatic species is presented in **Appendix F**.

4.2.3.2 Semi-volatile Organic Compounds

SVOCs are a diverse group of organic chemicals characterized by moderate volatility, including substances such as PAHs, PCBs, POPs, phthalates, and others[14]. SVOCs enter marine environments through atmospheric deposition, riverine input, runoff, and direct discharges from human activities. These compounds are persistent and can bioaccumulate and biomagnify through marine food webs (Moorhead 2022). In marine environments, particularly in cold regions, SVOCs degrade slowly which contributes to their persistence. SVOC compounds are stored in fatty tissues and become more concentrated at higher trophic levels such as marine mammals. The degree of accumulation and sensitivity to SVOCs varies by species, age, sex, and physiological condition. Contaminant loads and effects can vary geographically, depending on local sources, feeding habits of species in the area, and habitat use (Williams et al. 2023).

[13] https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#:~:text=The%20CCC%20of%2020mg/L,mg/L%20whichever%20is%20higher Accessed March 9, 2025
[14] https://www.epa.gov/east-palestine-oh-train-derailment/what-are-svocs-and-vocs; Accessed April 2025

SVOCs are listed in *40* CFR 401.15. **Section 6** provides an analysis of the potential effects of VOCs detected in AWPCF effluent on ESA-listed species and their prey in upper Cook Inlet. A discussion and summary of the current literature regarding potential effects of VOCs on aquatic species is presented in **Appendix F**.

4.2.3.3 Polycyclic Aromatic Hydrocarbons

PAHs are organic compounds composed of two or more carbon and hydrogen rings and are generally found in petroleum products (NMFS 2019a, Patel et al. 2020). They are less volatile and less soluble than BTEX compounds and are identified as SVOCs in the AWQS (ADEC 2022c).

For the 2023 monitoring results, concentrations of individual PAHs were summed and reported as total PAHs (TPAH). In addition to standard effluent sampling, TPAH concentrations were measured at the surface at six receiving water stations, with concentrations relatively low at both the control and outfall locations. TPAH values ranged from 0.007 to 0.091 µg/L at the control stations and from 0.034 to a maximum of 0.771 µg/L at the outfall stations. The TPAH concentration measured in the effluent sample was 4.884 µg/L. TAqH, as determined by the summation of PAHs plus BTEX for the six stations and effluent. All receiving water concentrations of TAqH were below the AWQS of 15 µg/L. There are no NRWQC for total PAHs or TAqH in marine waters.[15] Overall, TAqH concentrations ranged from <0.32 to <1.99 µg/L. The concentration of TAqH in the effluent was 12.81 µg/L, compared to the MAEC of 2,715 µg/L and the AWQS of 15 µg/L (Kinnetic Environmental Inc. 2024a).

Section 6 provides an analysis of the potential effects of PAHs detected in AWPCF effluent on ESA-listed species and their prey in upper Cook Inlet. A discussion and summary of the current literature regarding potential effects of PAHs on aquatic species is presented in **Appendix H**.

4.2.3.4 Persistent Organic Pollutants

Persistent organochlorine pollutants (POPs) are a large group of compounds that include PCBs; polychlorinated dibenzofurans (PCDFs); polychlorinated dibenzodioxins (PCDDs); pesticides such as dichlorodiphenyltrichloroethane (DDT) and its metabolite 1,1-dichloro-2,2-bis-ethylene (p,p'-DDE); polybrominated diphenyl ethers (PBDEs, or flame retardants); hexachlorocyclohexanes (HCHs); HCBs; hexabromocyclododecanes (HBCDs), dioxins, furans, and dioxin-like congeners (Bornman and Aneck-Hahn 2021).

The State of Alaska (ADEC 2022b) has promulgated acute and chronic marine aquatic life water quality standards (AWQS) for toxics and other deleterious substances, including PCBs and several pesticides (**Table 4-6**). These state standards for protection of aquatic life follow the NRWQC for marine waters.[16]

[15] https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#:~:text=The%20CCC%20of%2020mg/L,mg/L%20whichever%20is%20higher Accessed March 9, 2025.
[16] https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table Accessed September 23, 2024.

Table 4-6. National Recommended Marine Water Quality Criteria and State of Alaska Water Quality Criteria for Persistent Organic Pollutants

Compound	Concentration (µg/L)	
	Acute[a]	Chronic[b]
alpha-Endosulfan	0.034	0.0087
beta-Endosulfan	0.034	0.0087
Chlordane	0.09	0.004
Chlorpyrifos	0.011[c]	0.0056[d]
4,4′-DDT	0.13	0.001
Demeton	-	0.1
Diazinon	0.82	0.82
Dieldrin	0.071	0.0019
Endrin	0.037	0.0023
Guthion	-	0.01
Heptachlor	0.053	0.0036
Heptachlor Epoxide	0.053	0.0036
Lindane	0.16	-
Malathion	-	0.1
Methoxychlor	-	0.03
Mirex	-	0.001
Pentachlorophenol	13[c]	7.9[d]
PCBs	-	0.03
Toxaphene	0.21[c]	0.0002[d]
Tributyltin	0.042[c]	0.0074[d]

Source: (ADEC 2022b) and https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table. Accessed March 10, 2024.

[a] 24-hour maximum

[b] 24-hour average

[c] 1-hour average

[d] 4-day average

Under the current discharge permit, AWPCF routinely monitors those POPs that are on the priority pollutant list such as PCBs, DDTs, dioxin, and numerous pesticides in their bi-annual influent, effluent, and sludge toxic pollutant sampling effort. AWPCF sediment sampling in 2022 and 2023 provided site-specific information on the concentrations of several POPs from four subtidal and six intertidal locations (Kinnetic Environmental Inc. 2024f). No pesticides or PCBs were detected in sediment samples from any of the intertidal or subtidal locations. Dioxin was detected at a concentration of 1.31 nanograms per kilogram (ng/kg) in one sediment sample from the intertidal control station located directly across the inlet from Point Woronzof (IT-C). This value is slightly greater than NOAA's threshold effects level of 0.85 ng/kg. A derelict barge rests in the intertidal zone approximately 825 meters east of sampling site IT-C

and is a potential source of the dioxin detected in sediments at that site. Additional sampling in early 2024 included water samples from AWPCF effluent, upper Cook Inlet receiving waters, urban streams (Chester, Fish, and Ship creeks) and a stormwater outfall near Postmark Drive, which were tested for alpha-, beta-, and gamma-HBCDD (Kinnetic Environmental Inc. 2024b). HBCDD compounds were not detected in any of these samples.

Appendix A, **Tables A-4** and **A-5**, present the results of the 2024 fish tissue sampling effort, which analyzed tissues for the presence of priority pollutants and EPOCs. While the fish sampling locations are near the action area in Cook Inlet (refer to **Table A-3** for sampling locations), it is important to recognize that detection of a contaminant in sampled fish species could be from many sources outside the action area (refer to **Section 4.2**) and it may not be detected at all in the AWPCF effluent or ZID. For example, concentrations of PCBs were detected in samples 1,200 meters north of the action area near Point MacKenzie and along the eastern and western nearshore intertidal zone, although none of the fish tissue samples had contaminant levels expected to result in toxicity to fish or through bioaccumulation. Eulachon collected at Site IT-C4 (north of Point MacKenzie) of 3.4 and 5.8 micrograms per kilogram (µg/kg) (Aroclor 1254 and 1260, respectively). Aroclor 1254 was also detected in threespine stickleback samples collected at Sites IT-2 (4.6 µg/kg), IT-8 (3.7 µg/kg), IT-9 (4.1 µg/kg), and IT-C4 (4.9 µg/kg).

Section 6 provides an analysis of the potential effects of POPs detected in AWPCF effluent on ESA-listed species and their prey in upper Cook Inlet. A discussion and summary of the current literature regarding potential effects of POPs on aquatic species is presented in **Appendix F**.

4.2.4 Emerging Pollutants of Concern

According to EPA (2008), EPOCs (formerly termed contaminants of emerging concern or CECs) are chemicals and other substances that have no regulatory standard, have been measured in natural streams (often because of improved analytical chemistry detection levels), and potentially cause deleterious effects in aquatic life at low concentrations. EPOCs potentially detected in AWPCF effluent include surfactants and flame retardants, nonylphenols and 6-PPD (phenyl-p-phenylenediamine) quinone, pharmaceuticals, and personal care products and endocrine-disrupting hormones and sterols. Some EPOCs have been detected in AWPCF effluent that are neither regulated by AWQS (ADEC 2022c) nor described in the *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (ADEC 2022b). Some EPOCs may be authorized for discharge and dilution within mixing zones (NMFS 2019a). These EPOCs are discussed by main category in the subsections that follow.

4.2.4.1 Fluorinated Surfactants and Flame Retardants

In May 2010, AWWU collected samples of influent and effluent with a focus on seven distinct pollutant classes including perfluorocarbons. A total of 13 perfluorocarbon compounds were detected in the 2010 samples. Under the current discharge permit, AWPCF is not required to monitor effluent or receiving waters for per- and polyfluoroalkyl substances (PFAS) (Kinnetic Environmental Inc. 2022, 2023a, 2024a). However, in an effort to assess the potential existence of these chemicals in AWPCF effluent, AWWU tested samples collected in June 2023, which contained 261 nanograms per liter (ng/L) of total PFAS and 54.5 ng/L of perfluorooctanoic acid (PFOA), plus perfluorooctane sulfonic acid (PFOS) (Kinnetic Environmental Inc. 2024d). PFAS, PFOS, and PFOA chemicals are used in various everyday products such as nonstick coatings for cookware, stain-resistant clothing and carpets, and firefighting foam. For this reason, these compounds can be prevalent in the environment from many sources. The EPA has developed draft ambient water quality criteria for PFOA and PFOS (EPA 2022). In September 2024, EPA published a marine acute benchmark (BM) of 550 µg/L for PFOS and a marine acute BM for PFIA of 7,000 µg/L (EPA 2024b, c). BMs are not regulatory values but instead used for informational purposes.

In early 2024, AWPCF effluent and upper Cook Inlet receiving waters were tested for 41 individual PFAS compounds (Kinnetic Environmental Inc. 2024b). **Table 4-6** shows the PFAS+PFOS and total PFAS concentrations detected in the samples. As shown in the table, total PFAS were detected in the effluent sample (292.8 ng/L or 0.2928 μg/L), at the outfall (5.54 ng/L or 0.00554 μg/L), and at low concentrations (0.589 ng/L or 0.000589 μg/L) in the nearfield receiving water sample located 1,400 meters from the outfall. A water sample collected at the ZID boundary did not show detectable concentrations of these chemicals. Total PFAS were not detected in control samples collected across the inlet near Point MacKenzie but were found in three urban stream samples (Chester, Fish, and Ship creeks) and a stormwater outfall sample collected near Postmark Drive (refer to **Table 4-7**).

Hexabromocyclododecane (HBCCD also known as HBCD) is the third most commonly used brominated flame retardant in the world and is used in various applications such as polystyrene foam, textiles, and more. HBCD is classified as a POP based on its ability to persist in the environment and bioaccumulate in the food chain. The May 2024 sampling effort (refer to **Table 4-7**) did not detect HBCD in effluent, receiving waters, urban stream samples, or the stormwater outfall (Kinnetic Environmental Inc. 2024b).

Section 6 provides an analysis of the potential effects of PFAS, PFOA, and PFOS detected in AWPCF effluent on ESA-listed species and their prey in upper Cook Inlet. A discussion and summary of the current literature regarding potential effects of PFAS, PFOA, and PFOS on aquatic species is presented in **Appendix F**.

4.2.4.2 Nonylphenols and Nonylphenol Ethoxylates

Nonylphenols (NPs) and nonylphenol ethoxylates (NPEs) fall into the general chemical category of alkylphenols.

In 2014, EPA proposed a Significant New Use Rule (SNUR), which would require manufacturers to provide at least 90 days' notice to EPA before commencing or resuming any significant new use of 15 nonylphenols and nonylphenol ethoxylates (NPs/NPEs) that are no longer used in commerce. This gave EPA the opportunity to evaluate the intended use and, if warranted, take action to prohibit or limit the use of these compounds (EPA 2014).

The proposed SNUR covers only NPs/NPEs that are no longer being used in manufacturing or in commercial products; as of July 2024, it had not been finalized. NRWQC are not available for NP/NPEs, nor have they published recommended human health criteria for these compounds. For nonylphenol, the *State of Alaska Water Quality Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (ADEC 2022b) states acute (CMC) and chronic (CCC) criteria for freshwater aquatic life as 28 and 6.6 μg/L, respectively. Acute and chronic criteria for this compound for aquatic life in marine waters are 7.0 and 1.7 μg/L, respectively.

The AWPCF is not currently required to monitor effluent or receiving waters for NP/NPEs (Kinnetic Environmental Inc. 2022, 2023a, 2024a). However, AWWU collected influent and effluent samples with a focus on seven distinct pollutant classes including alkylphenols in 2010 and 2024. In 2010, a total of four alkylphenol compounds and Bisphenol A were detected (AWWU 2011). In early 2024, AWPCF effluent and upper Cook Inlet receiving waters were tested for four separate NP/NPEs: 4-n-octyphenol, 4-nonylphenol diethoxylate, 4-nonylphenol monoethoxylate, and 4-nonylphenol (Kinnetic Environmental Inc. 2024b). The initial results of the 2024 sampling study are shown in **Table 4-7**. As shown in the table, three of the four compounds were detected in both the effluent and the receiving water at the outfall. However, no NP/NPE compounds were detected at the nearfield sample location (1,400 meters from the outfall) or at

the control sites near Point MacKenzie. NPs were detected at two urban stream locations (Chester, Fish, and Ship creeks) and at one urban stormwater runoff location near Postmark Drive (refer to **Table 4-7**).

Section 6 provides an analysis of the potential effects of NP/NPEs detected in AWPCF effluent on ESA-listed species and their prey in upper Cook Inlet. A discussion and summary of the current literature regarding potential effects of NP/NPEs on aquatic species is presented in **Appendix F**.

4.2.4.3 6-PPD Quinone

The chemical 6-PPD quinone is a transformation product of tire breakdown and exposure to ozone. It is known to be acutely toxic to certain fish species (EPA 2024a). The very high sensitivity of coho salmon to 6-PPD quinone when Pacific salmon stocks are declining in many areas has led stakeholders (risk assessors, Environmental Quality Guideline specialists, conservationists, and Indigenous Peoples) to explore possible conservation and management policies for this compound (Lo et al. 2023). Data on chronic 6-PPD quinone toxicity and the compound's overall toxicity in estuarine/marine waters are extremely limited (EPA 2024a). While the EPA has drafted screening values for this compound in freshwater, currently there are no AWQS, NRWQC, or federal screening value for 6-PPD quinone in marine waters.

Under the existing NPDES permit, AWPCF is not required to monitor effluent or receiving waters for 6-PPD quinone or other products from tire wear (Kinnetic Environmental Inc. 2022, 2023a, 2024a). However, in an effort to understand whether this chemical exists in AWPCF influent, effluent, or receiving waters, the facility tested water samples collected in 2023. Less than 16 ng/L of 6-PPD-quinone was detected in the 2023 AWPCF effluent and receiving water samples (Kinnetic Environmental Inc. 2024d). As a follow-up analysis in early 2024, AWPCF effluent and upper Cook Inlet receiving waters were tested for 6-PPD quinone (Kinnetic Environmental Inc. 2024b). As shown in **Table 4-7**, 5.3 ng/L of 6-PPD quinone was detected in the effluent sample but not in any samples from upper Cook Inlet receiving water sites or control samples. While 6-PPD quinone was detected in two of three urban locations (Chester and Fish creeks, the sample from Ship Creek was requalified as not detected because of elevated levels in the method blank), the chemical was also detected in one urban stormwater runoff location near Postmark Drive.

Section 6 provides an analysis of the potential effects of 6-PPD quinone detected in AWPCF effluent on ESA-listed species and their prey in upper Cook Inlet. A discussion and summary of the current literature regarding potential effects of 6-PPD quinone on aquatic species is presented in **Appendix F**.

Table 4-7. Emerging Pollutants of Concern Detected in AWPCF Effluent and Receiving Water Samples in 2024

Compound	Concentration (ng/L)										
	Effluent	Outfall	ZID Boundary	Nearfield	Control – Point MacKenzie			Chester Creek	Fish Creek	Ship Creek	Postmark Dr. Storm Outfall
		F1-1	F1-2	F1-3	C1-1	C1-2	C1-3				
Fluorinated Surfactants and Flame Retardants											
HBCDD	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PFOA + PFAS	83.8	5.54	0	0.589	0	0	0	10.6	48.3	20.48	1,005
Total PFAS	292.8	10.4	0	0.589	0	0	0	29.4	141.8	45.58	3,532
Alkylphenols Nonylphenols											
4-n-octylphenol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-nonylphenol diethoxylate	1,470	3,98	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-nonylphenol monoethoxylate	10,300	1,600	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-nonylphenol	5,670	561	ND	ND	ND	ND	ND	105	28.2	ND	224
Bisphenols											
Bisphenol A	1290	300	UB	UB	UB	UB	UB	UB	UB	UB	UB
Bisphenol AF	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bisphenol B	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bisphenol E	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.4	ND
Bisphenol F	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bisphenol S	888	88.6	ND	ND	ND	ND	ND	ND	ND	ND	14.5
6-PPD quinone	5.3	UB	92.8/ND[a]	UB	UB	UB	UB	7.74	6.51	UB	10

Compound	Concentration (ng/L)										
	Effluent	Outfall	ZID Boundary	Nearfield	Control – Point MacKenzie			Chester Creek	Fish Creek	Ship Creek	Postmark Dr. Storm Outfall
		F1-1	F1-2	F1-3	C1-1	C1-2	C1-3				
Pharmaceuticals											
Triclosan (anti-bacterial)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diltiazem (anti-hypertensive)	96.1	7.19	ND	ND	ND	ND	ND	ND	ND	ND	ND
ESI Negative Hormones											
17 alpha-Dihydroequilin	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
17 alpha-Estradiol	ND	ND	7.84	ND	8.82	7.99	7.91	ND	ND	8.79	10.9 RJ
17 alpha-Ethinyl-Estradiol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
17 beta-Estradiol	5.52	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Equilenin	13.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Equilin	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Estriol	ND	12.8	ND	ND	ND	ND	ND	ND	ND	ND	ND
Estrone	33.1	3.46 RJ	ND	ND	ND	ND	ND	ND	ND	ND	ND
ESI Positive Hormones											
17 beta-Estradiol 3-benzoate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Allyl Trenbolone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Androstenedione	162	10.9	ND	ND	ND	ND	ND	ND	ND	ND	ND
Androsterone	57.1	39.1	ND	ND	ND	ND	ND	ND	ND	ND	ND
Desogestrel	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Mestranol	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Norethindrone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Compound	Concentration (ng/L)										
	Effluent	Outfall	ZID Boundary	Nearfield	Control – Point MacKenzie			Chester Creek	Fish Creek	Ship Creek	Postmark Dr. Storm Outfall
		F1-1	F1-2	F1-3	C1-1	C1-2	C1-3				
Norgestrel	81.8	4.08	ND	ND	ND	ND	ND	ND	ND	ND	ND
Progesterone	56.6	2.33	ND	ND	ND	ND	ND	ND	ND	ND	ND
Testosterone	71.7	3.85	ND	ND	ND	ND	ND	ND	ND	ND	ND

Source: Kinnetic Environmental Inc. (2024b).

[a] A duplicate sample from this location was ND for 6-PPD quinone.

ND = not detected.

RJ = Peak detected but did not meet quantification criteria; reported concentration is estimated.

UB = requalified to not detected based on elevated levels in the method blank(s).

4.2.4.4 Pharmaceuticals and Personal Care Products

No specific AWQS or NRWQC exist for pharmaceuticals and personal care products (PPCPs). However, the EPA has established a point source category for pharmaceutical manufacturing. Eight priority pollutants and 16 nonconventional pollutants are listed in this point source category (AWWU 2011). The EPA has identified 304 facilities throughout the U.S. that use solvents and discharge wastewater from pharmaceutical manufacturing processes. None are located in Alaska (AWWU 2011).

In 2010 and 2024, AWPCF influent and effluent samples were tested for PPCPs. In May 2010, sewage influent and final effluent water samples were tested for seven distinct pollutant classes including PPCPs. A total of 119 different PPCPs were detected in the samples (AWWU 2011). In 2024, pharmaceuticals were detected in effluent and receiving waters, as shown in **Table 4-7** (Kinnetic Environmental Inc. 2024b). As shown in the table, many compounds were not detected (ND) within the ZID or at the nearfield boundary. Seven compounds were detected at the outfall. Detection of a compound does not mean there is risk to aquatic species. Rather, several factors are taken into consideration not limited to dilution in the action area, and exposure amount and duration.

Section 6 provides an analysis of the potential effects of PPCPs detected in AWPCF effluent on ESA-listed species and their prey in upper Cook Inlet. A discussion and summary of the current literature regarding potential effects of PPCPs on aquatic species is presented in **Appendix F**.

4.2.4.5 Sterols and Hormones

There currently are no AWQS or NRWQC for hormones or sterols in wastewater or receiving waters. Steroid hormones are not regulated for surface waters in the U.S. (Almazrouei et al. 2023). However, substances with potentially endocrine disrupting properties that have not already been restricted are now subject to specific screening actions in the U.S. (EPA 2015b, 2023). According to Grzegorzek et al. (2024), the European Commission and the World Health Organization recommend a threshold value of less than 1 ng/cubic decimeter or 1 ng/L for concentrations of endocrine compounds in wastewater.

Sterols and hormones were tested for in AWPCF influent and effluent samples in 2010 and again in 2024. Samples of influent and effluent from May 2010 included a total of 27 compounds consisting of 10 sterols and 17 hormones (AWWU 2011). In 2024, AWPCF effluent, upper Cook Inlet receiving waters, three urban stream locations (Chester, Fish, and Ship creeks), and one urban stormwater runoff location near Postmark Drive were tested for 8 electrospray ionization (ESI) negative and 10 ESI positive hormones. As shown in **Table 4-7**, 17 alpha-estradiol was not detected in the effluent but was detected at the ZID boundary, at control locations across the inlet, in samples from Ship Creek, and in samples from the stormwater outfall at Postmark Drive (Kinnetic Environmental Inc. 2024b). 17 beta-estradiol and equilenin were detected in effluent samples only. Estriol was detected only in a sample collected at the outfall. Estrone, androsterone, norgestrel, progesterone, and testosterone were only detected in the effluent and at lower concentrations at the outfall. No other hormones were detected in any samples (Kinnetic Environmental Inc. 2024b).

Section 6 provides an analysis of the potential effects of sterols and hormones detected in AWPCF effluent on ESA-listed species and their prey in upper Cook Inlet. A discussion and summary of the current literature regarding potential effects of sterols and hormones on aquatic species is presented in **Appendix F**.

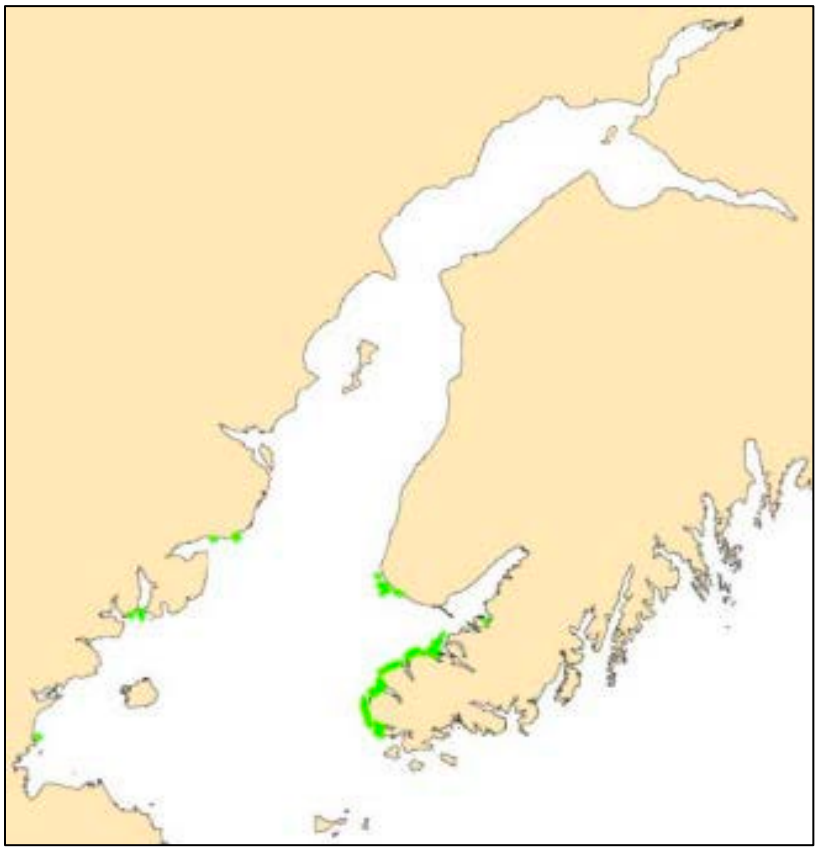
4.3 Biological Conditions

4.3.1 Marine Flora

As described in **Section 4.1** and shown on **Figure 4-4**, rocky habitat is predominant in and near the action area. Rocky shores generally are exposed, high-energy habitats with continuous erosion by wind-driven waves or strong currents (BOEM 2016). In some areas, the rocky substrate is stable enough to permit the attachment and growth of algae or lichens. Approximately 175 algal species are currently known to occur in Cook Inlet (Foster et al. 2010). In and near the action area, these can include green algae (*Enteromorpha linza, E. intestinalis*, and *E. prolifera*) and unicellular or filamentous algal mats of yellow-green algae (*Chrysophyta*) that grow on small rocks and boulders (Houghton et al. 2005). Rockweed (*Fucus gardneri*) can be relatively dense in intertidal zones in Knik Arm; it attaches to cobbles where there is some protection against ice scour (Houghton et al. 2005, Lindeberg and Lindstrom 2019).

Well south of the action area, algae, eelgrass beds, and kelp forests comprise marine and estuarine flora habitats (BOEM 2016). While eelgrass communities are common in protected estuaries, Cook Inlet does not offer extensive, suitable habitat for eelgrass (BOEM 2016). This likely is caused by high turbidity in the water column, glacial runoff during the summer growth season, and lack of suitable substrate (BOEM 2016). **Figure 4-5** shows that kelp forests are found in lower Cook Inlet, well outside of the action area.

Figure 4-5. Kelp Forests in Lower Cook Inlet



Source: Zimmermam and Prescott (2014)

4.3.2 Marine Invertebrates

Based on the effects of the large tidal amplitude, strong currents, large amounts of glacial and coastal sediment from rivers and erosion, and extreme winter ice scour, Knik Arm waters are considered to be a harsh marine environment (Houghton et al. 2005). These harsh conditions in the vicinity of the action area limit primary productivity; populations of benthic invertebrates are of low density in both the water column and on the beaches and mudflats (Bakus et al. 1979, Houghton et al. 2005). Therefore, compared to central and southern Cook Inlet waters, Knik Arm in the vicinity of the action area is characterized by low benthic and water column primary productivity and low to moderate densities of epibenthic and pelagic invertebrates.

Overall invertebrate numbers, diversity, and distribution are lower in Knik Arm and in the vicinity of the action area than invertebrate communities in central and lower Cook Inlet, where tidal currents are reduced (Houghton et al. 2005). The highly turbulent waters of Knik Arm in the vicinity of the action area cause invertebrates that would normally reside in the benthos to be suspended in the water column where they are swept back and forth with the strong tidal currents found in the area (Houghton et al. 2005). Only three species of intertidal invertebrates were found in Knik Arm beach sampling efforts by Houghton et al. (2005): (1) a fairly ubiquitous polychaete; (2) a bivalve with very limited distribution; and (3) a small snail species found in Cook Inlet only at Point Woronzof. In nearshore and offshore waters, mostly amphipods, mysids, and crangonids were collected. The density of invertebrates was very low during early spring and peaked in August through October. There was a notable absence of invertebrates in Knik Arm from November through April (Houghton et al. 2005). Unlike typical estuarine environments, crustaceans in Knik Arm are believed to feed primarily on organic material deposited on the bottom or suspended in the water column (Houghton et al. 2005).

Site-specific information on the benthic intertidal and infaunal communities was collected in 2022 and 2023 (Kinnetic Environmental Inc. 2024f). The intertidal community around Point Woronzof and Point MacKenzie were relatively simple with a total of only 10 taxa collected from the six intertidal benthic stations sampled during September 2022. Oligochaete and polychaete annelids (worms) were the predominant taxa found in the samples and were the most abundant (96%) infaunal organisms found at the four stations located closest to the outfall (Kinnetic Environmental Inc. 2024f). Based on these results, it is unclear whether the higher abundances of these annelids near the outfall are influenced by the associated discharge or if they are from differences in the organic and physical composition of the sediment near the outfall.

Total infaunal abundance and density among stations was highest at two stations near the ZID boundary (Stations IT-8 and IT-9) located an average of 570 meters from the diffuser. Densities of infaunal organisms were 4,651 per square meters (m^2) and 1,587/m^2 at Stations IT-8 and IT-9, respectively. Infaunal densities at farfield locations were lower at IT-2 (2,305/m^2) and IT-1 (898/m^2), while samples from the control stations IT-C4 and IT-C had infaunal densities of 180/m^2 and 50/m^2, respectively. These are intertidal stations located across the inlet near Point MacKenzie. A total of 969 individuals representing nine taxa were found. The average number of individuals per station was 161.5 and the average number of individuals per replicate was 26.9 (Kinnetic Environmental Inc. 2024f).

Along with several species of marine fish, spot shrimp (*Pandalus platyceros*) (**Figure 4-6**) have been identified as an invertebrate prey species for Cook Inlet beluga whales. During biological sampling efforts in 2022, 2023, and 2024 in support of this permit renewal application, spot shrimp were collected near the AWPCF outfall (Kinnetic Environmental Inc. 2024c). Spot shrimp are the largest shrimp in the North Pacific and are highly valued by commercial pot fishers and subsistence users alike (BOEM 2016).

Figure 4-6. Spot Shrimp



Source: (Kinnetic Environmental Inc. 2024c)

Shrimp inhabit varying depths and habitat types in Cook Inlet. Spot shrimp generally are associated with rock piles and debris-covered seafloor and can be found in the lower portions of Cook Inlet (BOEM 2016). They are caught in greatest concentrations at water depths of approximately 110 meters but are also found at depths as shallow as 4 meters (BOEM 2016).

In 2024, one composite tissue sample from spot shrimp collected within the action area at control site IT-C was tested for priority pollutants (refer to **Appendix A**). Other than a suite of metals and 4-nitrophenol at a concentration of 110 µg/kg, no priority pollutants were detected in the sample. EPOCs were also analyzed in the spot shrimp sample, which detected the following constituents: PFAS (range 0.917 to 1.06 µg/kg) and 10-hydroxy-amitriptyline (0.0921 µg/kg). For additional details, refer to **Appendix A**.

4.3.3 Marine Fish

This section focuses on marine fish (Pacific salmon; eulachon and longfin smelt; saffron and Pacific cod; starry flounder; staghorn sculpin and threespine stickleback) that may occur in the action area and have either been identified as important prey species for Cook Inlet beluga whales or are being targeted for tissue analyses as part of the 2022 to 2024 field sampling effort for this proposed action.

4.3.3.1 Pacific Salmon

Distribution in Cook Inlet

Cook Inlet is a migratory corridor and early life rearing area for all five species of Pacific salmon: Chinook (*Oncorhynchus tshawytscha*), sockeye (*O. nerka*), coho (*O. kisutch*), chum (*O. keta*), and pink (*O. gorbuscha*), and contains many freshwater streams that are important spawning habitat for these species (BOEM 2016, 2021, NMFS 2009). All Pacific salmon are semelparous and die after spawning once. **Table 4-8** describes salmon use of selected upper Cook Inlet drainages and Knik Arm, the location and timing of their presence in these areas, and their prey while in upper Cook Inlet. The subsections following the table discuss abundance and trends of Pacific salmon in upper Cook Inlet and the status of and risks to the species.

Table 4-8. Pacific Salmon Use of Cook Inlet Drainages Near the Action Area, Migration and Spawning Time Frames, and Prey

Salmon Species	Use of Cook Inlet Drainages Near Action Area[a]				Cook Inlet Migration and Spawning Time Frame	Prey
	Ship Creek[b]	Susitna River and Delta[c]	Deshka River[d]	Knik Arm[e]		
Chinook	MC SH JRH	SH JRH	SH JRH	MC SH JRH	▪ Adults in-migrate through Cook Inlet to spawn in these drainages from May to July. ▪ Juvenile out-migration can occur from April to September but peaks in spring and early summer.	▪ Adult Chinook do not feed while migrating through upper Cook Inlet to spawn or while spawning in Cook Inlet drainages. At sea adults feed on fish, pelagic amphipods, and krill. ▪ While in Knik Arm and upper Cook Inlet, juveniles feed primarily on terrestrial insects.
Coho	MC SH JRH	SH JRH	SH JRH	MC SH JRH	▪ Adults in-migrate through Cook Inlet to spawn in these drainages from June to August. ▪ Juvenile out-migration can occur from April to September but peaks in spring and early summer.	
Sockeye	MC	SH JRH	SH JRH	MC SH JRH	▪ Adults in-migrate through Cook Inlet to spawn in these drainages from late June to August. ▪ Juvenile out-migration can occur from April to September but peaks in spring and early summer.	
Pink	MC	SH JRH	SH JRH	MC SH JRH	▪ Adults in-migrate through Cook Inlet to spawn in these drainages from June to August. ▪ Juvenile out-migration can occur from April to September but peaks in spring and early summer.	
Chum	MC	SH JRH	SH JRH	MC SH JRH	▪ Adults in-migrate through Cook Inlet to spawn in these drainages from mid-July to mid-August. ▪ Juvenile out-migration can occur from April to September but peaks in spring and early summer.	

Sources: Funk et al. (2005), AWWU (2011), BOEM (2016), Frothingham and Willette (2018), Glick and Willette (2018), AKLNG (2019), BOEM (2021), Courtney et al. (2021), Giefer and Graziano (2023), Mauger et al. (2023), Lipka and Stumpf (2024) and

https://www.adfg.alaska.gov/sf/FishCounts/ Accessed February 19, 2024.

[a] Key: MC – migratory corridor; SH – spawning habitat; JRH – juvenile rearing habitat.

[b] Ship Creek runs though the city of Anchorage and empties into Lower Knik Arm near the Port of Alaska.

[c] Susitna River and Delta include the Yentna, Skwentna, Chulitna, Kashwitna, and Talkeetna rivers, and the Willow, Little Willow, Caswell, Sheep, Goose, Montana, Sunshine, Birch, Rabideaux, Fish and Clear creeks.

[d] The Deshka River is a tributary of the Susitna River.

[e] Knik Arm includes the Knik, Eagle, Little Susitna, and Matanuska rivers, the Cottonwood, Five Mile, and Six Mile creeks, and Goose and Eagle bays.

Abundance

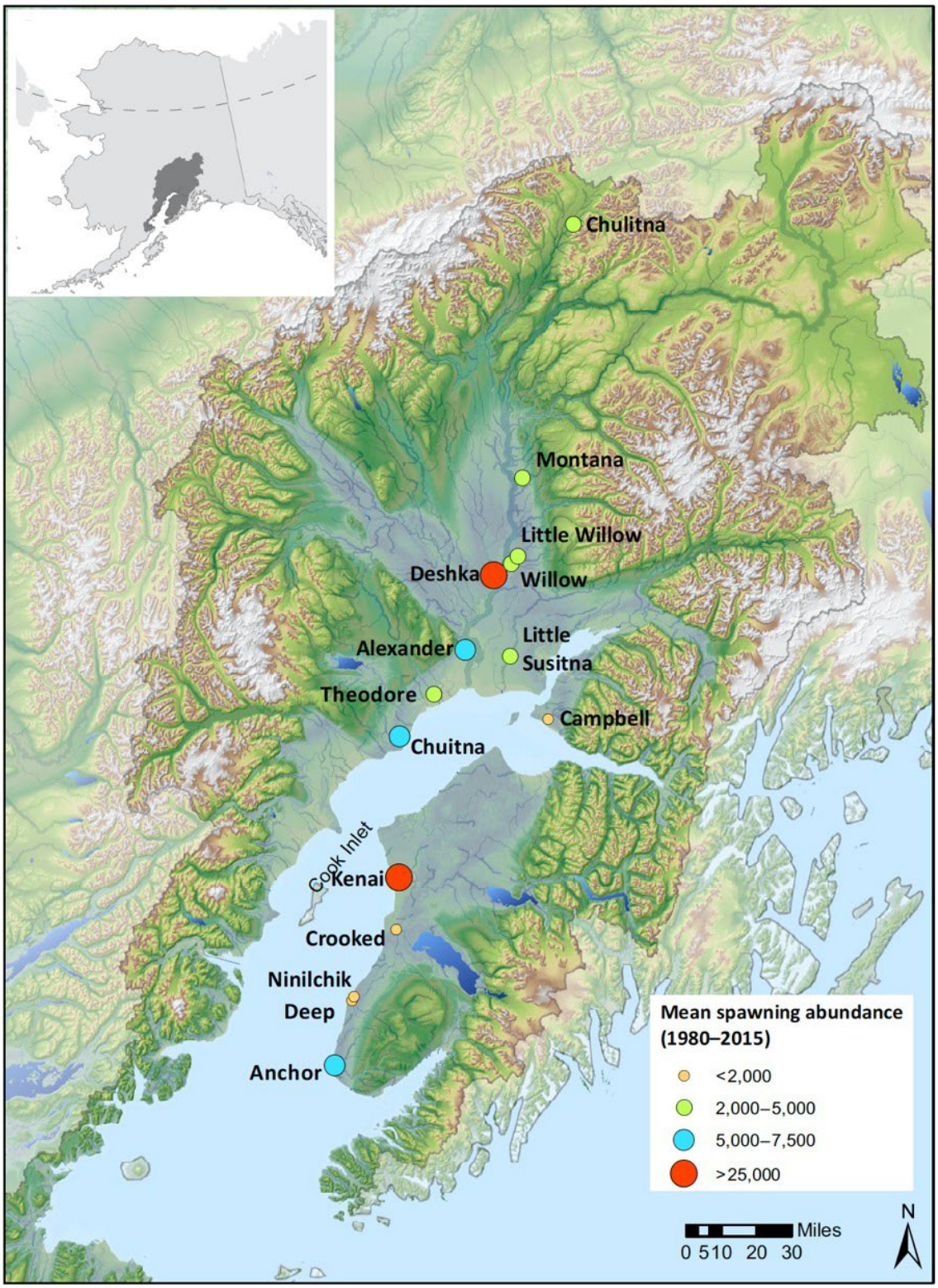
Spawning abundance of Pacific salmon in Cook Inlet is monitored using two primary methods: surveys and fish weirs. Many populations are monitored by conducting single aerial or foot surveys near the peak of the spawning run; these surveys provide an annual index of spawning abundance. For a smaller number of populations, fish weirs and sonar projects provide an approximate census of spawning abundance by recording escapement (Jones et al. 2020).

Chinook. According to unpublished data from Delany and Vincent-Lang cited in Reimer and Decovich (2020), the Susitna River drainage Chinook salmon run is the largest Chinook run within the upper Cook Inlet management area; it is the fourth largest Chinook run in Alaska, and is only smaller than Chinook runs into the Yukon, Kuskokwim, and Nushagak river drainages. Historically, estimates of the total Chinook salmon run into the Susitna River drainage have not been available, although it has long been assumed to number from 100,000 to 200,000 fish (Delaney and Vincent-Lang, unpublished data cited in Reimer and Decovich (2020)). From 2014 to 2019, Susitna River Chinook salmon mark/recapture studies have estimated an in-river run of Susitna River Chinook salmon of between 63,340 and 136,995 fish annually (Reimer and Decovich 2020). However, as described later in this section under Trends, these numbers are declining. **Figure 4-7** depicts the spawning abundance of Chinook salmon in Cook Inlet during the period 1980 to 2015. One Chinook salmon was captured and released during beach seining as part of the 2022 field sampling in support of this permit renewal application (refer to **Section 2.3**) (Kinnetic Environmental Inc. 2023b).

According to the *Run Forecasts and Harvest Projections for 2023 Alaska Salmon Fisheries and Review of the 2022* Season, the 2022 preseason run forecast for Deshka River Chinook salmon of 9,332 fish suggested that the harvest should be limited to achieve the sustainable escapement goal (SEG) of 9,000 to 18,000 fish. An SEG is defined as a level of escapement known to provide sustained yield during a 5- to 10-year period; the SEG is developed from the best available biological information (McKinley et al. 2020). Previously, the SEG for Deshka River Chinook was 13,000 to 28,000 fish (McKinley et al. 2020). The final escapement estimate of Chinook salmon in the Deshka River in 2022 was 5,436 fish (Donnellan and Munro 2023). The Little Susitna River Chinook salmon SEG range of 2,100–4,300 fish was achieved in 2022 with a weir count of 2,288 Chinook salmon; this count was considered to be incomplete based on flooding (Donnellan and Munro 2023).

However, not all Chinook salmon found in Cook Inlet waters are natal to drainages of Cook Inlet. Recent genetic analyses of Chinook salmon caught in recreational fisheries in Cook Inlet during the period 2014 to 2017 indicate that almost all Chinook salmon harvested in Cook Inlet are "feeders" from populations outside of the inlet, especially during the fall and winter months (Courtney et al. 2021). In contrast, maturing Chinook salmon that originate in Cook Inlet watersheds are primarily captured in both recreational and commercial fisheries from May to August; the exact timing for entry of these populations into Cook Inlet and their residency time within the inlet before entering natal streams is poorly understood. Courtney et al. (2021) document that large Chinook salmon that are natal to areas outside of Cook Inlet but occupy inlet waters in the winter may remain there for least 1 to 2 months and use a variety of offshore and nearshore habitats within the inlet. Cook Inlet is known to be a common winter feeding ground for Chinook and it is likely that many Chinook salmon feed in Cook Inlet for several months during the winter before moving to other areas for continued feeding or beginning their spawning migration (Courtney et al. 2021).

Figure 4-7. Mean Chinook Spawning Abundance in Cook Inlet Drainages 1980-2015



Source: Jones et al. (2020)

Sockeye: In 2017, Frothingham and Willette (2018) conducted an offshore test fishery from July 1 through July 31 and captured 2,586 sockeye salmon. They estimated a 2017 in-season total upper Cook Inlet run at 7.11 million sockeye salmon. This best-fit total run estimate was approximately 54.2% higher than the actual documented run size. The authors' in-season estimate for the Kenai River sockeye salmon run predicted a total run to the Kenai River of 1.6 to 4.3 million fish (Frothingham and Willette 2018).

According to the *Run Forecasts and Harvest Projections for 2023 Alaska Salmon Fisheries and Review of the 2022 Season*, the 2022 upper Cook Inlet area sockeye salmon estimated total run of 5.2 million fish was 300,000 fish larger than the preseason forecast of 4.9 million fish. As of March 2024, the upper Cook Inlet sockeye salmon total run was forecasted to be 5.72 million fish, which is now considered an average sized sockeye run. Forecasts of salmon fisheries are inherently uncertain and are primarily used to gauge the general magnitude of expected runs and guide early-season management strategies (ADF&G 2024a).

Coho: There are four coho salmon systems in upper Cook Inlet that have established coho escapement goals: Fish Creek; Little Susitna River; Deshka River; and McRoberts Creek, a small spawning tributary within the Jim Creek system. All except McRoberts Creek are assessed using weirs; the creek is assessed by foot survey (Donnellan and Munro 2023). Based on flooding and budget constraints, incomplete counts were obtained in 2022 from weirs on the Little Susitna and Deshka rivers. Even though the count from the Little Susitna River was incomplete, the SEG range of 9,200–17,700 fish would likely have been attained (Donnellan and Munro 2023). A weir-based coho salmon SEG of 10,200–24,100 fish was adopted for the Deshka River coho run in 2017 (McKinley et al. 2020). In 2022, only 3,168 coho salmon were counted though August 8; this is considered to be an incomplete count because of flooding (Donnellan and Munro 2023). Field sampling in 2022 to support this permit renewal application captured and released two coho salmon with a beach seine (refer to **Section 2.3** for additional details) (Kinnetic Environmental Inc. 2023b).

The current weir-based coho salmon SEG of 1,200 to 4,400 for Fish Creek was established in 2011 (McKinley et al. 2020). In 2022, the weir at Fish Creek was pulled at the end of July and the coho salmon run from this creek was not counted because of budget constraints (Donnellan and Munro 2023). The 2022 foot survey of McRoberts Creek resulted in an estimate of 1,899 coho salmon (Donnellan and Munro 2023). Therefore, the SEG of 450 to 1,400 coho for this stream that was established in 2014 (McKinley et al. 2020) was met in 2022.

However, in August 2024, the Alaska Department of Fish and Game (ADF&G) issued an emergency order closing Ship Creek to sport fishing for all species (ADF&G 2024b). A partial survey of Ship Creek conducted on August 19, 2024, counted only 181 coho salmon in the section of the creek near William Jack Hernandez Sport Fish Hatchery, and only 79 coho salmon had entered the hatchery raceway by that date. The hatchery needs at least 1,000 adult coho salmon to return to meet in-river and brood stock needs of the coho salmon stocking programs. Historically, 75% of the run has escaped the fishery and returned to the hatchery by that week in August. Given the low coho counts in the hatchery raceway and results of the partial survey, ADF&G found it necessary to close Ship Creek to all sport fishing so any remining coho can return to the hatchery (ADF&G 2024b).

Pink: Pink salmon runs in upper Cook Inlet are even-year dominant, with odd-year average harvests typically less than one-sixth of even-year harvests. The 2022 upper Cook Inlet commercial pink salmon harvest was estimated to be 100,998 fish (Donnellan and Munro 2023). In 2023, four pink salmon were captured and released as part of the multi-year biological sampling effort in support of this permit renewal (Kinnetic Environmental Inc. 2024c).

Chum: Peak season aerial fixed-wing surveys are used to determine escapement of chum salmon in Clearwater Creek, the only chum salmon stock in upper Cook Inlet that has an SEG (McKinley et al. 2020). An aerial survey of Chinitna River/Clearwater Creek was conducted on August 3, 2022. This survey produced an estimate of approximately 4,681 chum salmon within these streams, which was within the SEG range of 3,500 to 8,000 fish (Donnellan and Munro 2023). This SEG was set for Clearwater Creek in 2017 and no change was recommended (McKinley et al. 2020). The 2022 commercial harvest of chum salmon was 99,294 fish in upper Cook Inlet (Donnellan and Munro 2023).

Trends

Pacific salmon returns in Alaskan waters have been declining, which has led to restrictions in both directed fisheries, by catch in fisheries directed at other species, and recreational fisheries (ADF&G 2020, 2021, 2023, Courtney et al. 2021, Courtney et al. 2019, Harrison 2021). Trends in salmon abundance in upper Cook Inlet drainages can be ascertained from escapement and commercial harvest data. ADF&G collects salmon escapement data from weirs within selected streams and rivers that empty into upper Cook Inlet waters. As described in the section, escapement data were obtained from the ADF&G fish counts website to produce 20-year escapement trend graphs for the Deshka River and for the Little Susitna River. Data from these two rivers comprise the most applicable and complete escapement dataset available for upper Cook Inlet and this analysis.

The 2022 commercial harvest estimate of 102,630 coho salmon in upper Cook Inlet was 44% less than the previous 10-year average of 185,532 fish and the 2022 drift gillnet harvest of 51,306 coho salmon was 52% less than the 10-year average of 107,614 fish (Donnellan and Munro 2023). The 2022 upper Cook Inlet commercial pink salmon harvest estimate of 100,998 fish was 72% lower than the average annual harvest of 363,813 fish from the previous 10 years of even-year harvests (Donnellan and Munro 2023). The 2022 upper Cook Inlet chum commercial harvest of 99,294 fish was 34% lower than the 10-year average annual harvest of 151,247 fish (Donnellan and Munro 2023). As shown in **Table 4-9**, the trend of declining commercial harvest for upper Cook Inlet fisheries as summarized from ADF&G (2023) continued; the 2023 harvest of all five Pacific salmon species was lower than the average of the 20 previous years.

Table 4-9. 2023 Upper Cook Inlet Commercial Harvest of Pacific Salmon Compared to 2003-2022 Average Harvest

Species	2023 Upper Cook Inlet Commercial Harvest	2003-2022 Upper Cook Inlet Average Harvest	Percent Difference
Chinook	723	10,443	-93%
Sockeye	1,600,000	2,600,000	-40%
Coho	83,912	178,919	-53%
Pink[a]	66,236	82,486	-20%
Chum	127,150	129,201	-2%

Source: ADF&G (2023)

[a]Pink salmon runs in upper Cook Inlet are even-year dominant, with odd-year average harvests typically less than even-year harvests, so the average of odd-year harvests only is shown.

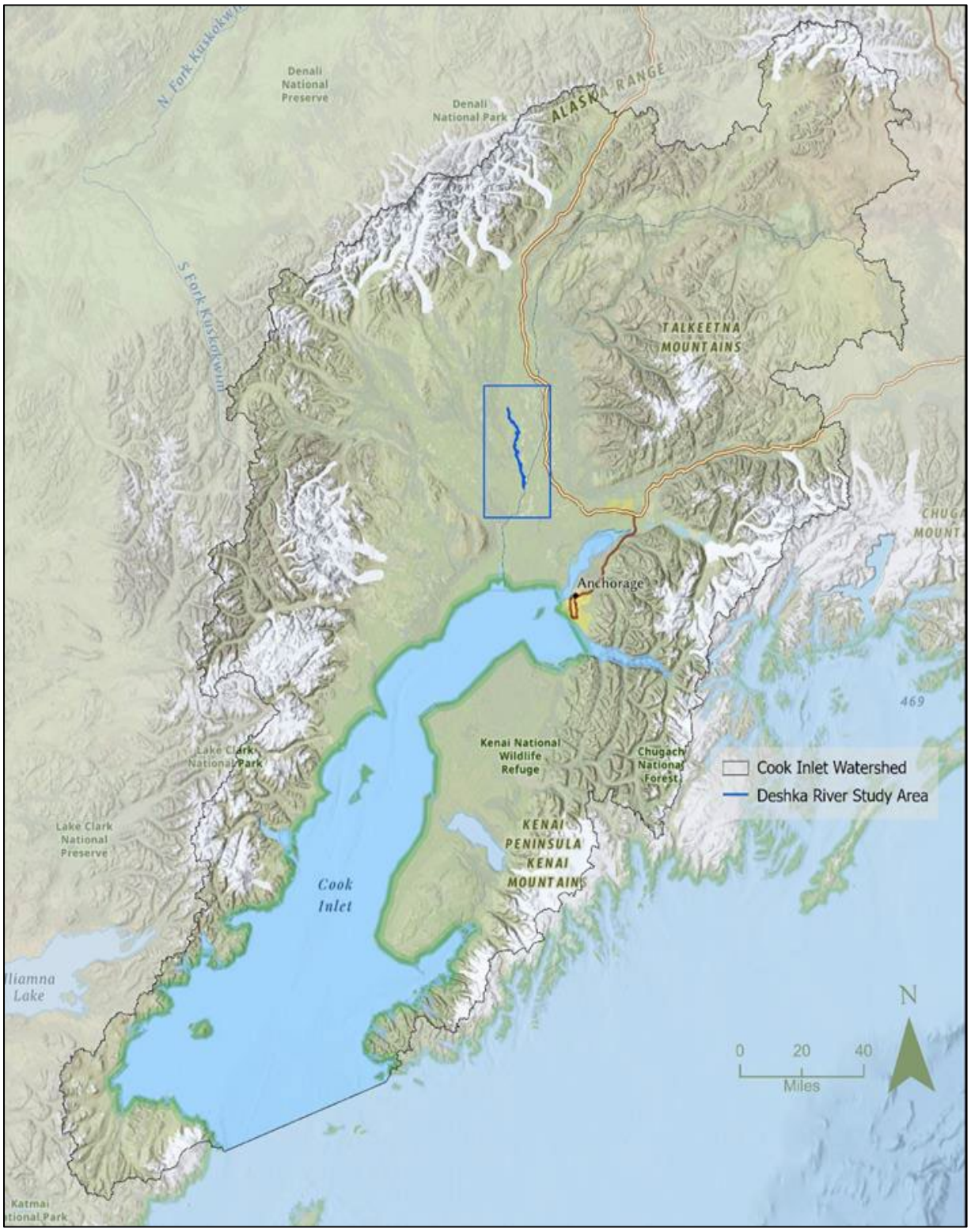
The following subsections describe specific trends in salmon abundance for the specific rivers located in upper Cook Inlet.

Deshka River: The Deshka River is a tributary of the Susitna River and drains extensive lowlands in the Susitna valley (**Figure 4-8**); it provides important habitat for migrating and spawning Chinook and coho salmon (Mauger et al. 2023). A weir located at river mile 7 has been used to count returning adults on the Deshka River since 1995 (Reimer and Decovich 2020). Dann et al. (2018) studied genetic markers and determined that Deshka River Chinook are identifiable as unique from all other Cook Inlet salmon fisheries.

The Deshka River is currently managed by an SEG based on the number of fish passing though the weir. As shown in **Figure 4-9**, coho and Chinook escapement numbers in the Deshka River peaked in 2004 and have been declining ever since. The 2024 end of run cumulative escapement of Chinook salmon in the Deshka River was 3,445 fish[18].The current SEG in the Deshka River for Chinook is 9,000 to 18,000 fish and the SEG for coho is 10,200 to 24,100 fish.[17] Based on weir fish counts, the SEG for Chinook was not met in 2022 or 2023, as only 5,436 and 3,741 Chinook passed the weir through August of each year, respectively. However, the Chinook SEG in the Deshka River was met in 2019 (9,639 fish), 2020 (10,638 fish), and 2021 (18,583 fish). The SEG for coho has not been met in the Deshka River for the last 4 years with only 5,368 (2020), 8,338 (2021), 3,186 (2022), and 1,817 (2023) fish counted though September 8 of those years. In 2023, the coho salmon weir count on the Deshka River was considered to be incomplete because of flooding; however, based on the rate of returns, it is unlikely that the SEG for coho was achieved (ADF&G 2023). In 2019, the coho count of 10,445 barely exceeded the lower SEG for that species. The 2024 end of run cumulative escapement of coho salmon in the Deshka River was 642 fish[18].

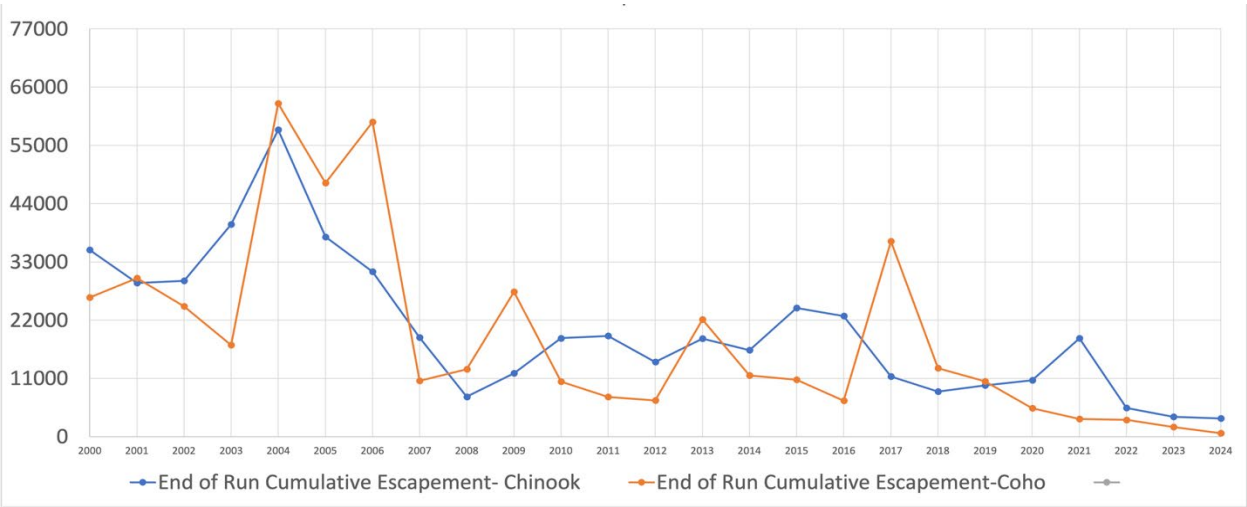
[17] https://www.adfg.alaska.gov/sf/FishCounts/index.cfm?ADFG=main.displayResults Accessed February 21, 2024 and July 10, 2025

Figure 4-8. Deshka River Location



Source: Mauger et al. (2023)

Figure 4-9. Deshka River Salmon Escapement Trends 2000-2024



Source: https://www.adfg.alaska.gov/sf/FishCounts/. Accessed February 13, 2024 and July 10, 2025.

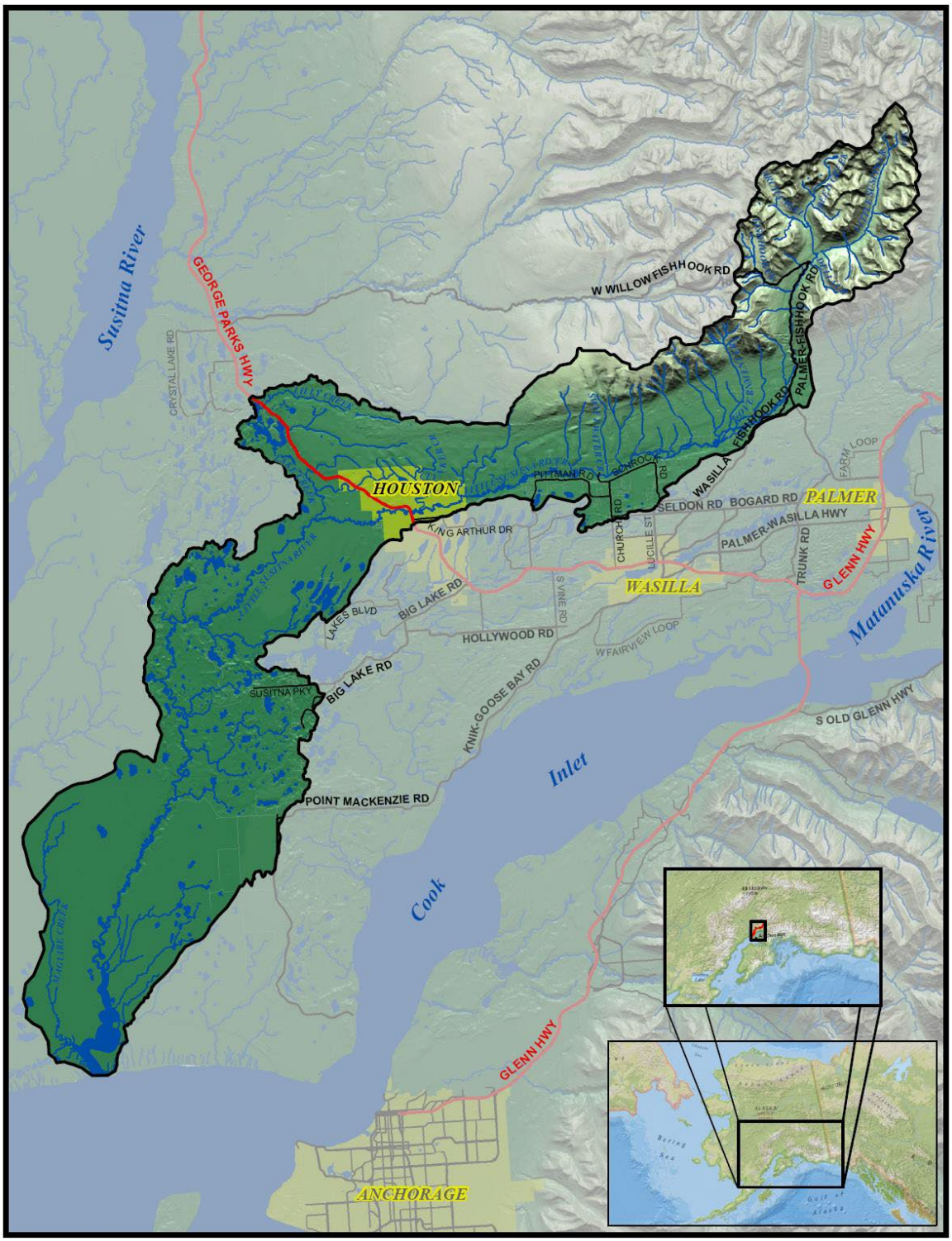
Sockeye and chum runs on the Deshka River are small with fewer than 100 fish per year. Pink runs are variable, from nearly 1 million fish to fewer than 10,000 fish.

Little Susitna River: The Little Susitna River is a clear stream that flows out of the Talkeetna Mountains and runs through a constricted, boulder-choked canyon before becoming a slow, meandering river. It empties into Cook Inlet across from and to the west of Point Woronzof (**Figure 4-10**). The little Susitna River supports strong runs of coho, chum, and pink salmon and moderate runs of Chinook salmon.[18]

ADF&G's Little Susitna weir is located approximately 6.5 kilometers upstream of the public use facility off Point MacKenzie Road. **Figure 4-11** shows that, since approximately 2012, chum have been the most abundant Pacific salmon species counted, with runs of coho, Chinook, and sockeye decreasing since approximately 2016/2017. The SEG in the Little Susitna River for Chinook is 2,100 to 4,300 fish and the SEG for coho is 9,200 to 17,700. Based on weir fish counts, the SEG for Chinook was not met in 2023 as only 753 Chinook passed the weir through August of 2023. However, the Chinook SEG was met in 2022 (2,237 fish), 2021 (3,121 fish), and 2020 (2,424 fish). The SEG for coho has was not met in 2023 with only 3,726 fish counted through August 31, 2023, and 3,162 fish counted in 2022. In 2023, the coho salmon weir count on the Little Susitna River was considered to be incomplete because of flooding; however, based on the rate of returns, it is unlikely that the SEG for coho was achieved (ADF&G 2023). Counts of 10,923 and 10,765 coho in 2021 and 2020, respectively, exceeded the lower SEG for that species.

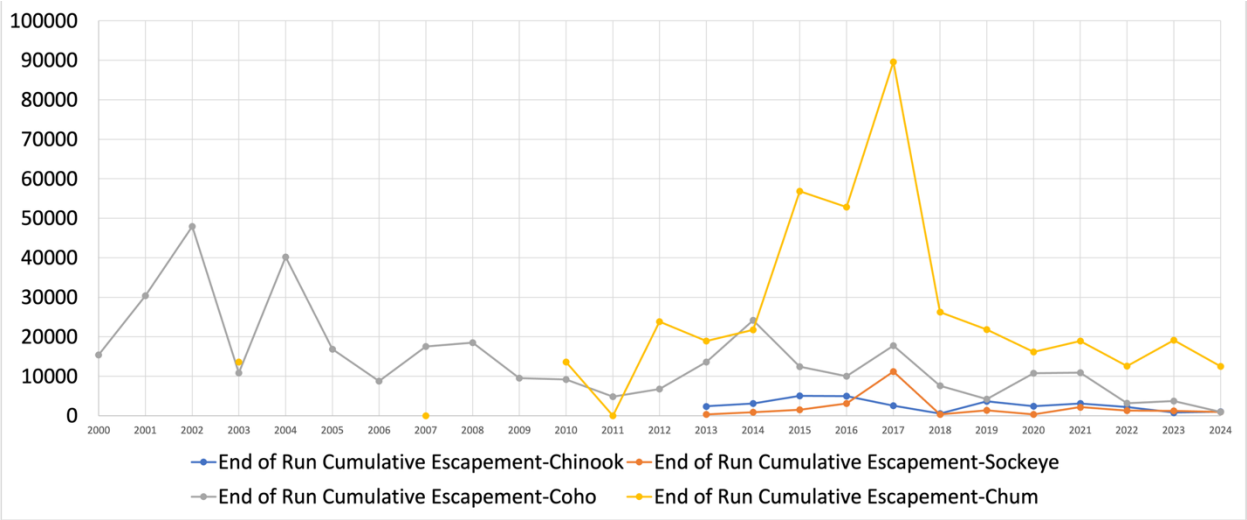
[18] https://www.adfg.alaska.gov/sf/FishCounts/index.cfm?ADFG=main.displayResults&COUNTLOCATIONID=16&SpeciesID=410 Accessed February 21, 2024

Figure 4-10. Little Susitna Drainage Map



Source: Maw and Salmon (2013).

Figure 4-11. Little Susitna River Salmon Escapement Trends 2000-2024



Source: https://www.adfg.alaska.gov/sf/FishCounts/ Accessed February 13, 2024 and July 10, 2025.
Chinook and sockeye: no data 2000-2012; chum no data 2000-2002, 2004-2006, and 2008-2009.

On April 29, 2024, NMFS published a final rule to implement Amendment 16 to the Fishery Management Plan (FMP) for the Salmon Fisheries in the Exclusive Economic Zone (EEZ) off Alaska (NMFS 2024e), which was later corrected on May 29, 2024, to include the correct length for drift gillnet gear of 200 fathoms (365.76 meters) (NMFS 2024f). Amendment 16 established federal fishery management for all salmon fishing that occurs in the Cook Inlet EEZ, which includes commercial drift gillnet and recreational salmon fisheries. This action complies with rulings from the U.S. Court of Appeals for the Ninth Circuit and the U.S. District Court for the District of Alaska to ensure the Salmon FMP is consistent with the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act). Within the action area for the AWPCF NPDES permit, no additional drift gillnet harvest is expected in the Northern District of State Waters because this area is closed to that gear group. So while shifts in harvest from the EEZ to State Waters may disperse an unknown amount of fishing pressure on some salmon runs, changes in State escapement goals are not expected (NMFS 2024d).

Status and Risks

No stocks of Pacific salmonids that originate from freshwater habitat in Alaska are listed under the ESA. However, the Wild Fish Conservancy, a Washington state-based nongovernmental organization, filed a petition on January 11, 2024, that NMFS list Gulf of Alaska Chinook salmon or any evolutionarily significant unit (ESU) that uses the area as threatened or endangered under the ESA (Wild Fish Conservancy 2024). The petition identifies Chinook populations that use the Gulf of Alaska, including fish that spawn in the rivers of Cook Inlet.

NMFS published a positive 90-day finding in response to the petition on May 24, 2024, announcing that one or more ESUs of Gulf of Alaska Chinook salmon may warrant listing under the ESA (NMFS 2024a). In the 90-day finding, while NMFS acknowledged numerous factual errors, omissions, incomplete references, and unsupported assertions in the petition, other information such as missed escapement goals in recent years and evidence of decreasing size and age at maturity may indicate that listing Gulf of Alaska Chinook salmon is warranted (NMFS 2024a). Therefore, NMFS will conduct a status review to determine whether Gulf of Alaska Chinook salmon constitute one or more ESUs, and if so, whether any ESUs of Gulf of Alaska

Chinook salmon are in danger of extinction (endangered) throughout all or a significant portion of the range or are likely to become so within the foreseeable future (threatened). The agency requested information from the public, government agencies, Alaska Native organizations, the scientific community, industry, conservation groups, fishing groups, or any other interested parties along with comments regarding the 90-day finding (NMFS 2024a). On June 28, 2024, NMFS extended the comment period to September 6, 2024 (NMFS 2024b).

Within 12 months of the receipt of the petition, NMFS has 1 year to make a finding as to whether listing any Gulf of Alaska Chinook salmon ESU as threatened or endangered under the ESA (referred to as a status review) is warranted. If the status review determines that listing is warranted, NMFS will publish a proposed rule for public comment before making a final decision on the listing status of any Gulf of Alaska Chinook salmon.

Researchers have attributed recent declines in Cook Inlet Chinook salmon populations in part to climate-driven changes in temperature and streamflow in freshwater habitats (Jones et al. 2020, Mauger et al. 2023). Declines in Cook Inlet salmon populations have been linked to large-scale climate drivers, but uncertainty remains about the role of local conditions (precipitation, streamflow, and stream temperature) that vary among the watersheds where salmon spawn and rear (Jones et al. 2020). Jones et al. (2020) also identified a strong negative association between increases in maximum monthly precipitation and Chinook salmon population productivity.

The Deshka River is among the warmest salmon systems in the Susitna River drainage, with summer water temperatures regularly exceeding thresholds considered stressful for rearing juveniles and spawning adult salmon.[19] In recent years, water temperatures measured in the Deshka River have been as high as 27°C, with an average increase of 1.5°C since 1980 (Jones et al. 2020). Weekly water temperature averages are projected to exceed 26.0°C by 2060 (Mauger et al. 2023) and are already exceeding weekly averages projected for 2030 (Mauger et al. 2023, Mauger et al. 2017).

Water temperature affects all phases of the salmon lifecycle: egg/embryo survival; juvenile growth; timing of seaward migration; and migration rate of returning adults. Warm water temperature induces stress in salmon and makes them more vulnerable to contaminants, predation, and disease. Research indicates that warm summer temperatures negatively impact the survival of juvenile Chinook salmon rearing in the Deshka River and other streams around the region (Jones et al. 2020, Mauger et al. 2017). During spawning and migration, periods of high river temperatures can block migratory corridors and cause thermal stress or mortality in salmon (Mauger et al. 2023, Richter and Kolmes 2005). In addition, the Deshka River is home to an invasive population of northern pike, which were illegally introduced to the Susitna River basin in the 1950s (Sepulveda et al. 2015). Pike consume a substantial biomass of juvenile salmon, which may lead to the collapse of salmon stocks.

Maw and Salmon (2013) theorize that decreased Pacific salmon runs in the Little Susitna River are the result of public access allowing strong recreational fishing pressure, hook and release mortality, parasites, diseases, invasive northern pike, warm water temperatures (13°C), blocked culverts, beaver dam blockages, urbanization, and impaired water quality.

Other studies have linked Pacific salmon population declines in Cook Inlet to poor marine stage survival (Courtney et al. 2019). Recent research suggests that mortality of Chinook salmon in older marine life stages has increased in recent years because predation by killer whales (*Orcinus orca*), Steller sea lions (*Eumetopias jubatus*), harbor seals (*Phoca vitulna*), and salmon sharks (*Lamna ditropis*) has increased in

[19] https://www.fishhabitat.org/waters-to-watch/detail/deshka-river-alaska Accessed February 20, 2024

recent years (Chasco et al. 2017, Courtney et al. 2021) and may explain declines in abundance and demographic changes of adult returns (Ohlberger et al. 2019, Seitz et al. 2019). All these species of apex predators are known to occupy Cook Inlet.

The commercial salmon fishery harvested 1.9 million salmon in 2023; this was 41% less than the recent 20-year average annual harvest of 3.1 million fish (ADF&G 2023). Of the five species of Pacific salmon harvested in upper Cook Inlet, sockeye salmon accounted for 92% of the total ex-vessel value during the past 20 years. Historically, personal use salmon fisheries in Cook Inlet resulted in the harvest of an average of more than 465,000 salmon per year from 2005 to 2015 (NMFS 2017b). In 2023, personal use fisheries employing dip nets in the Kenai and Kasilof rivers and Fish Creek removed a total of more than 530,000 Pacific salmon, of which greater than 97% were sockeye salmon.[20] Tribal members throughout Cook Inlet participate in all Cook Inlet salmon fisheries, including the drift gillnet and other commercial, recreational, subsistence, tribal, ceremonial, educational, and personal use salmon fisheries (NMFS 2023a). For subsistence alone, the most recent ADF&G subsistence report documents the historical average subsistence harvest of salmon in Cook Inlet area of less than 5,400 fish (Fall et al. 2014).

The effects of these removals on the salmon populations and on marine mammals using Cook Inlet, such as Cook Inlet beluga whales, remains undetermined (NMFS 2017b). Proposed changes to managing Cook Inlet salmon commercial fisheries include adding management measures for the recreational salmon fishery sector (NMFS 2023a) and may change the overall management of salmon harvest removals in Cook Inlet.

4.3.3.2 Eulachon and Longfin Smelt

Eulachon (*Thaleichthys pacificus*) are small anadromous smelts (Family Osmeridae) found only along the Northwest Pacific Coast of the United States.[21] Eulachon, along with longfin smelt (*Spirinchus thaleichthys*), are important prey species for marine and freshwater fish, marine mammals, and sea birds; they are lipid-rich and good sources of energy-rich food during the periods when other food sources may be less abundant (Moody and Pitcher 2010). Eulachon spawn in slow-moving rivers and streams. Young eulachon migrate to salt water where they grow to maturity. At sea, they feed mainly on euphausiids (krill).[22] Adult eulachon migrate back to spawn in freshwater steams that have the best habitat conditions at the time. They do not feed while spawning in freshwater nor while migrating in estuarine waters such as upper Cook Inlet. Newly hatched longfin smelt are carried by river currents to the inlet from their natal streams where they feed on copepod larvae and plankton. As juveniles and adults, they feed mainly on small crustaceans, especially copepods, cumaceans, and euphausiids.[23]

Distribution in Cook Inlet

Upper Cook Inlet waters support large eulachon runs from the Susitna and Kenai rivers and a smaller run that returns to the Twentymile River, which empties into Turnagain Arm (Moody and Pitcher 2010). From mid-May to mid-June, eulachon migrate through Cook Inlet waters returning to spawn in these drainages (Shields 2005). As the spawning season approaches, eulachon gather in large schools off the mouths of spawning streams and rivers. The upstream migration is keyed closely to stream water temperature (BOEM 2016). After spawning, most eulachon die.

[20] https://www.adfg.alaska.gov/index.cfm?adfg=PersonalUsebyAreaSouthcentralfishCreekSalmon.harvest Accessed February 21, 2024.
[21] https://www.fisheries.noaa.gov/species/eulachon Accessed February 15, 2024
[22] https://www.adfg.alaska.gov/index.cfm?adfg=eulachon.main Accessed February 16, 2024
[23] https://www.adfg.alaska.gov/index.cfm?adfg=longfinsmelt.main Accessed February 16, 2024

Longfin smelt (**Figure 4-12**) are also seasonally abundant in Cook Inlet. Smelt return to Cook Inlet each year in the fall (Shields and Dupuis 2013) and, as with eulachon, gather in large schools off the mouths of freshwater spawning streams and rivers (BOEM 2016). Because stream temperature can affect spawning migration timing, numbers of spawning longfin smelt returning to a particular stream can vary greatly from year to year (BOEM 2016). Abookire and Piatt (2005) note that longfin smelt tend to be associated with warm, less saline, shallow mid-water habitats. During 2022 and 2023, 78 and16 (respectively) longfin smelt were captured and released as part of the biological field sampling to support this permit renewal application (Kinnetic Environmental Inc. 2023b).

Abundance and Trends

Eulachon aggregate during spring spawning migrations in upper Cook Inlet, but few quantitative data have been collected on the abundance of these returns (Bechtol 2023). The most recent data for upper Cook Inlet were collected in 2016, when ADF&G estimated abundance and biomass of eulachon that spawn in the Susitna River (ADF&G 2017). The estimates were calculated indirectly from larval densities and stream discharge data collected from May 12 to July 6. Model results indicated that that the estimated total eulachon biomass in the drainage was 48,000 metric tons (ADF&G 2017).

Figure 4-12. Longfin Smelt



Source: Kinnetic Environmental Inc. (2024c)

There are no recent studies of longfin smelt abundance in upper Cook Inlet waters. Patterns of genetic structure, diversity, and gene flow are poorly understood for this species and population estimates are not available. Sixteen longfin smelt were captured and released during the 2023 field studies for this proposed action (Kinnetic Environmental Inc. 2024c). Additional details on project-specific biological sampling to support this permit renewal are described in **Section 2.3**. No longfin smelt were collected during a near-shore fish distribution sampling effort conducted in lower Cook Inlet waters at the mouth of Kachemak Bay (Abookire et al. 2000). Overall strength of longfin smelt returns vary across the state by year and location. It is not clear why run strength remains strong in some areas while weak in other areas.[24]

[24] https://www.adfg.alaska.gov/index.cfm?adfg=longfinsmelt.main Accessed February 16, 2024

Status and Risks

Eulachon and longfin smelt in Alaska waters are not listed under the ESA. According to ADF&G, the main threat to eulachon[25] and longfin smelt[26] populations in Alaska is the potential overharvest from personal use, subsistence, or commercial fisheries. In Cook Inlet, particularly at Twentymile Creek in Turnagain Arm, personal use and subsistence harvests of eulachon and longfin smelt occur during their respective runs. The fish are harvested using dip nets, gillnets, and seines. They are frozen, dried, and smoked mostly for human consumption.

Longfin smelt are not commercially targeted in upper Cook Inlet based on the small size of their runs (Lipka and Stumpf 2024, Marston and Frothingham 2020, Shields and Dupuis 2013). However, eulachon return in sufficient quantities to support a limited commercial fishery; it is the first anadromous commercial fishery that occurs each year in early spring (Lipka and Stumpf 2024). The upper Cook Inlet eulachon fishery is conducted under ADF&G's Forage Fish Management Plan, with specific direction from the Cook Inlet Smelt Fishery Management Plan. The eulachon fishery is allowed from May 1 to June 30 in Cook Inlet, specifically northeast of the mouth of the Chuitna River to the Little Susitna and Susitna rivers, south of 61°21.41″ N. Legal gear for the commercial fishery is limited to hand-operated dip nets, and the total allowed harvest level is 181.5 metric tons or less (Lipka and Stumpf 2024).

4.3.3.3 Saffron and Pacific Cod

Both saffron and Pacific cod are bottom-dwelling fast-growing demersal fish that mature quickly (BOEM 2016). Their eggs are demersal and adhesive and hatch in approximately 13 to 14 days, depending on water temperatures. Pacific cod larvae are pelagic; adults and juveniles feed on pollock, herring, smelt, mollusks, crabs, shrimp, and other similar-sized marine organisms (BOEM 2016). Saffron cod larvae are also pelagic and feed on plankton; juveniles and adults are epibenthic feeders whose preferred prey is amphipods (Wolotira Jr. 1985).

Mature saffron cod are generally longer than 200 millimeters in fork length (FL) and they may grow to more than 500 millimeters FL (Sme et al. 2017). The total body length of Gulf of Alaska Pacific cod at 50% maturity is approximately 503 millimeters (NMFS 2019d).

Distribution in Cook Inlet

Saffron cod (*Eleginus gracilis*) is a gadid fish that ranges into the northern Gulf of Alaska waters (Sme et al. 2017). With the exception of mid-winter months, saffron cod are common in upper Cook Inlet waters (Houghton et al. 2005). Pacific cod (*Gadus microcephalus*) (**Figure 4-13**) distribution in the Gulf of Alaska overlaps with that of saffron cod (Sme et al. 2017). There are limited data from ADF&G concerning Pacific cod distribution in Cook Inlet in the spring, but studies from other areas suggest that beginning in the fall Pacific cod migrate to major spawning areas where they overwinter and then disperse to summer feeding grounds after spawning (Shimada and Kimura 1995). Observations during the commercial Pacific cod fishery in Cook Inlet also indicate an increase in Pacific cod catch rates during the winter months, which generally peak in February and March, and subsequently decline by late April (Rumble et al. 2019). Both saffron and Pacific cod have been identified as potential Cook Inlet beluga prey resources during late winter and early spring (Castellote et al. 2020a, Houghton et al. 2005).

[25] https://www.adfg.alaska.gov/index.cfm?adfg=eulachon.main Accessed February 16, 2024
[26] https://www.adfg.alaska.gov/index.cfm?adfg=longfinsmelt.main Accessed February 16, 2024

Figure 4-13. Pacific Cod



Source: (Kinnetic Environmental Inc. 2023b)

Abundance and Trends

According to Hulson et al. (2023), the Gulf of Alaska Pacific cod stock remains at low levels but is greater than the unfished spawning biomass ($B_{20\%}$) for 2024. $B_{20\%}$ is the minimum spawning stock size threshold instituted to help ensure adequate forage for the endangered Western DPS of Steller sea lions. The Alaska Fishery Science Center (AFSC) estimates Gulf of Alaska Pacific cod biomass and abundance from biennial bottom trawl surveys (Hulson et al. 2023). **Table 4-10** shows the estimated Gulf of Alaska Pacific cod biomass and abundance estimates for 2011 to 2023. Biomass and abundance estimates for saffron cod in the Gulf of Alaska are not available.

Table 4-10. Gulf of Alaska Pacific Cod Biomass and Abundance Estimated from AFSC Bottom Trawl Surveys

Year[a]	Estimated Biomass (metric tons)[b]	Abundance (count)
2011	455,000	348,060
2013	459,000	337,992
2015	230,000	196,334
2017	97,000	56,199
2019	165,000	127,188
2021	158,000	90,914
2023	210,000	138,683

Source: Hulson et al. (2023).

[a]Surveys are conducted every other year.

[b]Rounded to nearest 1,000 metric tons

Pacific cod abundance in the Gulf of Alaska and surrounding areas experienced a drastic decline in 2016 to 2018, which resulted in a 77% reduction in harvest levels in the Cook Inlet Area from more than 1,600 metric tons in 2017 to 304 metric tons in 2018 (Rumble et al. 2019). This reduction is reflected in AFSC's estimated biomass numbers shown in **Table 4-10** (Hulson et al. 2023) and has been attributed to an ocean condition called the "warm blob," a marine heat wave that negatively affected some marine species, including Pacific cod (refer to Status and Risks). As shown in **Table 4-10**, biomass and abundance of Pacific cod as estimated from AFSC bottom trawl surveys in the Gulf of Alaska increased in 2023, but it is not known if the increasing trend will continue. During the 2022 field sampling effort to support this permit renewal application, 15 Pacific cod were captured using a beach seine near Point Woronzof and then released (refer to **Section 2.3**) (Kinnetic Environmental Inc. 2023b).

Status and Risks

Cod are ectotherms; temperature directly affects their metabolism (Barbeaux et al. 2018). Research has shown that Pacific cod are very sensitive to water temperature, particularly during early stages of development. Optimal egg development occurs in slim margins of temperature, salinity, and oxygen levels (Barbeaux et al. 2018). Cold sea surface temperatures have been linked to higher cod larval abundance and survival, while warmer water temperatures support fewer larvae (Doyle and Mier 2016). As described in Abundance and Trends, the Gulf of Alaska "warm blob" negatively affected Pacific cod populations.

Higher temperatures increase metabolic demands of Pacific cod; thus, the "warm blob" also negatively affected primary production and reduced abundance of key zooplankton species, such as copepods and krill. These depletions of food sources for higher trophic levels resulted in increased mortality (Barbeaux et al. 2018).

Saffron and pacific cod are taken in commercial and subsistence fisheries. The total harvest for the 2019 Pacific cod season in Alaska state-waters comprised 260 metric tons of the 287.5 metric tons allowable harvest level (Rumble et al. 2019). The Pacific cod fishery in Alaska waters is dominated by vessels using pot gear; longline is not a legal gear type for this fishery in Alaska. Pot vessels harvested 99% of the total harvest and seven vessels made 54 landings. Jig vessels harvested 1.3 metric tons of Pacific cod and three vessels made four landings (Rumble et al. 2019). Saffron cod are a subsistence species for Alaska Natives and, based on interest in Asia, they are currently harvested mostly by Russian fishermen (Wolotira Jr. 1985) They have potential to be commercially harvested in North America through development of a local small boat fishery using vessels and gear already available in western Alaska (Sme et al. 2017, Wolotira Jr. 1985).

4.3.3.4 Starry Flounder

Starry flounder (*Platichthys stellatus*) inhabit Cook Inlet (BOEM 2016) and have been identified as a prey item for Cook Inlet beluga whales (Castellote et al. 2020a, Houghton et al. 2005). Starry flounder are characterized by star-like markings and flattened body structure (**Figure 4-14**). They can reach a maximum length of 60 centimeters and can weight up to 2 kilograms.[27]

[27] https://www.alaskahandbook.com/nature/starry-flounder/ Accessed February 23, 2024

Figure 4-14. Starry Flounder



Source: https://www.alaskahandbook.com/nature/starry-flounder/ Accessed February 23, 2024

Starry flounders inhabit coastal waters with sandy or muddy bottoms from shallow intertidal zones to depths of 600 m.[28] They feed primarily on benthic invertebrates such as polychaetes, crustaceans, and mollusks as well as small fish and fish eggs. Starry flounder are relatively long lived for their size; females can live up to 17 years, while males have been known to survive for 25 years under the right conditions.[29] They spawn from November to February and are most active during December and January.

Although not in high demand commercially, starry flounder in the Gulf of Alaska are managed as part of the shallow-water flatfish complex. In the *2023 Assessment of the Shallow-water Flatfish Stock in the Gulf of Alaska*, Bryan (2023) estimated the biomass of Gulf of Alaska starry flounder to be 23,072 metric tons in 2023 and projected that the 2024 biomass would be the same.

Although they are relatively safe from predators because of their ability to camouflage themselves against the sea floor, starry flounder are predated upon by larger fish such as ling cod, halibut, and rockfish as well as marine mammals such as Cook Inlet beluga whales, Steller sea lions, and harbor seals in Cook Inlet.[30] Because they thrive in cold water, climate-change-induced warming water temperatures could pose a significant threat to starry flounder survival.[31]

4.3.3.5 Pacific Staghorn Sculpin and Threespine Stickleback

Sticklebacks (Gasterosteidae) and sculpins (Cottidae) are ubiquitous in the upper portions of Cook Inlet (BOEM 2016). Seventeen species of sculpin have been found in Kachemak Bay (Kachemak Bay Research Reserve 2012). During 2023, 453 threespine sticklebacks were captured near Point Woronzof using a beach seine as part of the biological field sampling to support this permit renewal application. A similar sampling effort in 2022 only caught one stickleback (refer to **Section 2.3** for additional details) (Kinnetic Environmental Inc. 2023b).

[28] https://www.alaskahandbook.com/nature/starry-flounder/ Accessed February 23, 2024.
[29] https://www.americanoceans.org/species/starry-flounder/ Accessed February 23, 2024.
[30] https://www.americanoceans.org/species/starry-flounder/ Accessed February 23, 2024.
[31] https://www.americanoceans.org/species/starry-flounder/ Accessed February 23, 2024.

Staghorn sculpins (*Leptocottus armatus*) are smooth skinned, greenish brown with some yellow, and have 2 to 6 prongs along their spines (**Figure 4-15**). They can grow up to 46 centimeters (Kachemak Bay Research Reserve 2012). Female sculpins lay masses of eggs on various substrates; the eggs are either fertilized internally prior to laying or externally after laying. Male sculpins guard the eggs from predators. The eggs eventually hatch, and planktonic larvae emerge to feed on other planktonic life near the surface (Kachemak Bay Research Reserve 2012). Adults feed on shrimp, crabs, and other fish.[32]

Figure 4-15. Pacific Staghorn Sculpin



Source: KEI 2023 AWWU Field Study

Pacific staghorn sculpins spend most of their lives in saline and brackish waters. They are commonly found in nearshore areas of bays and estuaries; most often on sandy substrates. Adults are common in sheltered marine estuaries, while juveniles are more often found in freshwater streams and upper estuarine, lower salinity, environments.[33] In 2022, as part of the biological field sampling to support this permit renewal application, four staghorn sculpin were captured near Point Woronzof using a beach seine (refer to **Section 2.3**) (Kinnetic Environmental Inc. 2023b).

The threespine stickleback (*Gasterosteus aculeatus*) is a small, streamlined, torpedo shaped fish. Its common name is derived from the presence of three (but occasionally 2 to 4) sharp spines on the back forward of the dorsal fin (**Figure 4-16**). This is a benthic species that typically occurs in quiet vegetated areas with sand and mud (ADF&G 2006).

[32] https://inaturalist.ca/taxa/49163-Leptocottus-armatus Accessed February 26, 2024.
[33] https://inaturalist.ca/taxa/49163-Leptocottus-armatus Accessed February 26, 2024.

Figure 4-16. Male Threespine Stickleback



Source: https://www.adfg.alaska.gov/static/species/speciesinfo/_aknhp/Threespine_Stickleback.pdf Accessed February 26, 2024.

Threespine sticklebacks are generalist carnivores that feed on benthic invertebrates and zooplankton. Adults also prey on fish eggs and fry (ADF&G 2006). Because the threespine stickleback is small, abundant, and a slow swimmer, it is suitable prey for a wide variety of species.[34]

4.3.4 2024 Supplemental Marine Fish Tissue Sampling Results

In 2024, marine invertebrate tissue samples from four marine fish species (eulachon, Pacific cod, Starry flounder (EPOCs only), and threespine stickleback) collected within the action area (refer to **Table 4-11** for the list of sites) and Twentymile River were tested for priority pollutants and EPOCs. All spotted shrimp samples were collected at Site IT-C.

Table 4-11. Fish Sampling Stations 2024

Station No.	Station Depth	Station Location
IT-2	Intertidal	1,200 meters east of Outfall
IT-C	Intertidal	North on Point MacKenzie side, across from diffuser (Control)
IT-8	Intertidal	Intertidal in eastern nearshore area within ZID boundary
IT-9	Intertidal	Intertidal in western nearshore area within ZID boundary
IT-C4	Intertidal	North of Point MacKenzie at historic IC4 site
Ship Creek[a]	Creek	Mouth of Ship Creek
Twentymile River	Creek	Mouth of Twentymile River

[a]ADF&G Emergency Order 2-SS-2-56-24 closed the Ship Creek sport fishing for all species through September 30, 2024. This prevented sample collection at Ship Creek.

[34] https://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=702 Accessed February 26, 2024

PCBs were not detected in AWPCF effluent samples; detected body burdens in fish most likely originate from cumulative sources excluding the AWPCF discharge. Certain pesticides were detected in AWPCF effluent, although pesticide concentrations in fish tissues are likely from multiple sources given how mobile fish species are (that is, fish do not spend 100% of their lifetime near the outfall where they could be exposed to AWPCF effluent). Elevated levels of PCBs and pesticides were detected in threespine stickleback and eulachon samples (wet weight). More specifically, 15 micrograms per kilogram (μg/kg) of alpha-chlordane (Sampling Site IT-2 north of Point Woronzof along the coast) and 4.6 μg/kg of Aroclor 1254 (Site IT-C4 north of Point MacKenzie along the coast) were detected in the threespine stickleback tissue sample. In the eulachon sample from Sampling Site IT-4, 3.4 and 5.8 μg/kg of Aroclor 1254 and 1260, respectively, were detected. PCBs were detected in one sample of eulachon (Site IT-C4). Pesticides were also detected in one Pacific cod sample (Site IT-8). Pesticide concentrations found in effluent and in fish tissues are not expected to pose risk to prey fish or marine mammals (refer to **Section 6** and **Appendix C**).

Heavy metals were detected in fish tissues of all four species collected (**Appendix A**); however, detection of metals does not necessarily mean exposure is from AWPCF effluent. For example, only some metals were detected in both AWPCF effluent and in fish tissues . Zinc, methyl mercury, and mercury have the highest tissue concentrations (refer to **Appendix A**). The highest detected levels in each species were reported as 14.3 μg/kg in eulachon, 16.2 μg/kg in Pacific cod, 50.9 μg/kg in threespine stickleback, and 10.8 μg/kg in spotted shrimp. All detected metals in fish tissue were evaluated in the risk evaluation (**Appendix C**). While metals were detected, the concentrations of metals in collected fish tissue are not expected to pose risk to marine mammals that may eat them as prey. The levels of metals in fish tissue are representative of the cumulative bioaccumulation obtained from the organism's home range, which may be large or small depending on resource availability and site fidelity.

Most EPOCs were not detected in fish tissue samples (refer to **Appendix A**). For those that were detected, the following summary provides an overview of the amounts detected. PFAS was reported in each species, with the highest detected level of 0.963 μg/kg in Pacific cod from Site IT-2. There was also a detection of 3.84 μg/kg of the hormone 17 beta-Estradiol in one threespine stickleback sample from Site IT-C. Bisphenol A was detected (7.85 μg/kg) in Pacific cod from Site IT-C and the highest reported level of bisphenol A in threespine stickleback was 4.12 μg/kg from Site IT-9. Hydrocortisone was detected in every species except spotted shrimp at levels ranging from 3.49 μg/kg in Pacific cod from Site IT-2 to 442 μg/kg in eulachon, also from Site IT-2.

4.4 Anthropogenic Activities in Upper Cook Inlet

Information on the existing anthropogenic activities within or near the action area is summarized in this section. Although it does not represent all anthropogenic activities, it is representative of the types of activities that occur and how they might affect the listed species and critical habitat evaluated herein. **Table 4-12** provides a list of recent informal and formal ESA consultations completed by NMFS of some relevant examples of anthropogenic activities. For each project listed in **Table 4-12**, a Biological Opinion or Letter of Concurrence (for formal and informal consultations, respectively) was published by NMFS and are available on the following website: https://www.fisheries.noaa.gov/resource/tool-app/environmental-consultation-organizer-eco.

Table 4-12. NMFS Formal and Informal ESA Consultations Near the Action Area 2021 to 2024

NMFS Record ID	Title	Consultation Conclusion Date
Formal ESA Consultations		
AKRO-2021-00298	Port of Anchorage [Alaska] Fender Repair	2/26/21
AKRO-2021-01051	Port of Alaska's South Floating Dock, Anchorage, Alaska	8/9/21
AKRO-2022-01395	Hilcorp 5-year Maintenance Plan, Cook Inlet 2022	8/12/22
AKRO-2023-00144	Knik Arm pile repairs	4/12/23
AKRO-2022-03630	Port of Alaska North Extension Stabilization (NES) Project	12/18/23
Informal ESA Consultations		
AKRO-2023-02164	Amendment 16 Salmon Fishery Management Plan	2/7/24
AKRO-2024-00025	Anchorage Fish Creek Trail Connection Project	2/7/24
AKRO-2024-00927	Hilcorp Cook Inlet Tidal Survey	6/11/24
AKRO-2023-03569	Cook Inlet Drilling - Furie	9/11/24
AKRO-2023-03574	Hilcorp Cook Inlet tugs towing a rig 2024	9/4/24
AKRO-2024-02054	ARRC Bridge 114.3 Replacement Project, Anchorage, Alaska	10/1/24

Source: https://www.fisheries.noaa.gov/resource/tool-app/environmental-consultation-organizer-eco Accessed September 2024.

Note: Some of these activities may be considered future activities discussed in cumulative effects (**Section 6.3**).

In addition to the specific projects listed in **Table 4-12**, the following subsections summarize the major types of anthropogenic activities that contribute to the environmental baseline in upper Cook Inlet.

4.4.1 Ted Stevens Anchorage International Airport

The AIA is located 8 kilometers southwest of downtown Anchorage and adjacent to Point Woronzof (north) (**Figure 4-17**). During the winter months, deicing of aircraft and airfield pavement operations at AIA are conducted to ensure the safety of passenger and cargo flights. AIA tenants use glycol-based aircraft deicing fluid to remove and prevent ice and snow buildup on aircraft surfaces prior to departure. The Airport Authority also uses anti-icing agents on runways and taxiways. Depending on conditions, an annual average of between 250,000 and 500,000 gallons of glycol-based deicing/anti-icing chemicals are used (ADEC 2019b).

AIA operates under a stormwater general permit developed specifically for the airport by ADEC (referred to as ANC-GP)[35]. This general permit replaced the Multi-Sector General Permit for industrial facilities that was previously in place[36]. The general permit went into effect November 1, 2019, and expired on October 31, 2024 (ADEC 2019a). This permit has been administratively extended until a new version is issued, expected in summer 2025. Permittees will have 120 days to file for coverage under the new permit once the new version is issued. The boundaries of AIA, an area of approximately 4,612 acres, are covered by the permit along with contributing to discharges to the airport's separate storm sewer. The permit requires the

[35] https://dec.alaska.gov/water/wastewater/stormwater/permits-approvals/anc-gp/faq/; Accessed April 2025
[36] https://dec.alaska.gov/water/wastewater/stormwater/permits-approvals/anc-gp/ Accessed August 2, 2024

Airport Authority and co-permittees to comply with non-numeric, technology-based effluent limits by implementing control measures and requires that the airport have a Stormwater Pollution Prevention Plan. In addition, there are specific requirements to implement source reduction techniques in the application of deicing fluid onto aircraft, within the bounds of Federal Aviation Administration aircraft safety considerations. It is anticipated the glycol usage reduction techniques of forced air, proportional mix nozzles, or low flow nozzles, will reduce the amount of glycol being applied to the aircraft. The permit also requires a study for the capture and recycle of aircraft deicing fluid[34]. The Airport Authority must sample and analyze stormwater discharges and report the results to the ADEC along with any corrective actions undertaken.

4.4.2 Port of Alaska and Port MacKenzie

The Don Young Port of Alaska (POA) is located near the action area on Knik Arm in upper Cook Inlet (refer to **Figure 4-17**). POA is Alaska's largest seaport and provides critical infrastructure for the movement of goods to the state. Docks at the POA move more than 4 million tons of goods and materials annually; 90% of Alaska's population uses goods moved through the port (NMFS 2023b). Existing facilities at the POA include three cargo terminals, two petroleum terminals, one dry barge berth, two miles of rail-spur connected to the Alaska Railroad, and two floating, small-vessel docks, plus 220 acres of land located in Anchorage. The POA supports more than $14 billion in commercial activity in Alaska; it is the main inbound containerized freight and fuel distribution center for the State of Alaska.[37]

The POA transfers and stores petroleum oils, as well as other hazardous materials (NMFS 2023b). Ballast water discharge from ships that use the port is another source of potential contamination as well as potential release of nonindigenous organisms into Cook Inlet (NMFS 2017a). Waters receiving discharges from the POA include Knik Arm/upper Cook Inlet.

The POA has been issued APDES permit number AKS-052426 (ADEC 2020b) that authorizes the operation of a Municipal Separate Storm Sewer. The permit is valid until July 31, 2025. The POA's APDES permit limits the types and amounts of substances that can be discharged and sets requirements for monitoring and reporting. These provisions are intended to ensure that the discharge does not harm human health or water quality. The permit also outlines compliance responsibilities, limitations, and requires a Stormwater Management Program. If the permit conditions are not met, civil, administrative, or criminal penalties may apply (ADEC 2020b).

Port MacKenzie consists of a 5-km^2 waterfront-dependent zone and a 12-km^2 commercial port district. The Port has a 365-meter-deep water and shallow water dock designated as the barge dock. Although the Port's dock infrastructure was designed for specific vessel types, the infrastructure is able to handle a wide variety of vessels from bulk ships to cargo ships to tugs and container barges. In 2011, a new rail corridor was approved for construction although was delayed, which has limited the Port's use (International Association of Maritime and Port Executives (IAMPE) 2021). The Matanuska-Susitna Borough continues to discuss expansion and upgrades to the facility to accommodate future barge traffic, thereby reducing the amount of cargo transported by roadway from the Port of Alaska, approximately 120 kilometers away (Matanuska-Susitna Borough 2023).

4.4.3 Urban Development

The upper Cook Inlet region is the most populated and industrialized region of Alaska. Its waters receive various discharges from sources such as oil and gas activities (for example, discharges of drilling muds and

[37] https://www.portofalaska.com/about-us/ Accessed August 2, 2024

cuttings, production waters, treated sewage effluent, deck drainage); municipal sewage treatment plants; runoff from urban, agriculture, and mining activities; airport deicing; military training at Eagle Bay; oil and other chemical spills and leaks; fish processing waste; and other regulated discharges (NMFS 2017a). From 1994 to 2011, there were 255 events in or near Cook Inlet that released more than 378.5 liters or 45.4 kilograms of reportable substances (ADNR, Division of Oil and Gas, 2011, unpublished data, as cited in NMFS (2016b). These spills included 90 events releasing a total of 318,713 liters of various types of oils (diesel, hydraulic, gasoline, engine lubricants, aviation fuel, and natural gas); 48 events releasing a total of 96,165 liters and 11,364,847 kilograms of hazardous materials (bases or alkaline substances, drilling muds, glycols, and urea); and 73 events releasing 110,332 kilograms and 5,958 liters of extremely hazardous substances (anhydrous ammonia, hydrochloric acid, and sulfur dioxide). As described in **Section 4.2**, since 2014, in the region ADEC refers to as North Cook Inlet, there have been 10 reportable spills of crude oil and 34 reportable spills of noncrude oil, each type with an average volume of 21 gallons. Permitted discharges into Cook Inlet are regulated by either the EPA or ADEC, which may authorize certain discharges under the NPDES/ APDES (Section 402 of the CWA of 1972).

4.4.4 Vessel Traffic and Underwater Sound

Vessel traffic in Cook Inlet transits through the ports near Kodiak, Homer, and Anchorage. Oilfield service vessels, tugs, and tour boats represent 86% of the total vessel operating days in Cook Inlet (BOEM 2016). **Figure 4-17** shows the vessel density in Cook Inlet in 2021. During summer, vessel traffic in the portions of upper Cook Inlet near the action area consists of large container ships and tankers, small recreational watercraft, and vessels associated with the oil and gas industry (Cape International 2012).

Figure 4-17. Cook Inlet Vessel Density Heat Map 2021

Source: https://erma.noaa.gov/arctic#layers=4+49898+16590+49908&x=-152.35016&y=64.61213&z=5.2&panel=legend

According to the Cook Inlet Vessel Traffic Study by Cape International (2012), the following vessel transit patterns were found for Cook Inlet:

- Deep draft vessels generally transited along the eastern side of Cook Inlet.
- Shelikof Strait on the western entrance to Cook Inlet was used less frequently by large vessels.
- Eighty percent of large ship operations were made by only 15 vessels that regularly called at Homer, Nikiski, or Anchorage.
- Vessel traffic was very consistent throughout the year along the Forelands.
- Kachemak Bay had the highest level of traffic activity in Cook Inlet, with most large ships entering the mouth of the bay to pick up a marine pilot or await USCG inspection. The bay was also a frequent and preferred port of refuge for ships and tugs waiting out bad weather.
- Tanker ships occasionally transited east to west and back between the Port of Nikiski and the Drift River Terminal Facility.

Oil service vessels accounted for most of the large vessel activity outside of the traditional north-south transit lines in order to service the oil and gas production platforms. In addition, these vessels' tracks frequently intersected the north-south transit lines (Cape International 2012).

Watercraft are the primary source of chronic sound exposure for marine mammals (Erbe et al. 2019). Commercial shipping traffic is a major source of low-frequency (5 to 500 Hertz [Hz]) human-generated sound in the oceans (NRC 2003). Source levels of 130 to 160 decibels (dB) referenced to 1 microPascal (µPa) at 1 meter (dB re 1 µPa m) have been reported for small watercraft such as jet skis and rigid-hulled inflatable boats (Erbe 2013, Erbe et al. 2016). Recorded source levels for large and powerful watercraft such as ferries and container ships are around 200 dB re 1 µPa m and louder (Erbe and Farmer 2000, Gassmann et al. 2017, Simard et al. 2016). In shallow water, vessels more than 10 kilometers from a receiver generally contribute only to background sound levels (NMFS 2015).

Ambient anthropogenic sounds have been reported as high and variable throughout Cook Inlet, with Castellote et al. (2019) recording the loudest and most frequent anthropogenic sounds in the vicinity of the Port of Alaska and lower Knik Arm. In early studies, Blackwell and Greene Jr. (2003) measured ambient underwater and in-air sound levels in Cook Inlet at locations positioned away from industrial activities. Mean ambient underwater sounds in Cook Inlet ranged between 95 dB re 1 µPa to 120 dB re 1µPa. The peak underwater sound level recorded by Blackwell and Greene Jr. (2003) was near Point Possession at 124 dB re 1 µPa.

Castellote et al. (2019) analyzed 8,756 hours of acoustic recordings collected from different locations in Cook Inlet during different time periods. The authors identified nine sources of anthropogenic sound: commercial ship traffic; aircraft (commercial or military nonfighter jets and helicopters, military fighter jets, and propeller aircraft); outboard motors, pile driving; dredging; sub-bottom profilers; and four repetitive but unidentifiable sound sources. Anthropogenic sound was present during each day sampled (Castellote et al. 2019). Ambient sound (without anthropogenic contributions) in areas with currents and vegetative debris was below 120 dB rms re 1µPa for 94% to 100% of the time.

In a subsequent study, Castellote et al. (2024) found minimal contribution to the soundscape from outboard motors and aircraft in Tuxedni and Chinitna bays located in western lower Cook Inlet. Commercial ships were the dominant anthropogenic sound source in both bays, similar to areas of upper Cook Inlet. However, Castellote et al. (2024) reported that ambient sound levels reported in lower Cook Inlet sites were much lower than the measured sound levels and prevalence as compared to upper Cook Inlet sites. Ship generators were the second most common sound source in both bays, likely from vessels anchored or idling within the acoustic range of the moored instruments. Commercial shipping along with the associated generator sounds dominated the anthropogenic soundscape accounting for 99% of all sound in waters of Tuxedni Bay and 88% for waters of Chinitna Bay (Castellote et al. 2024).

4.4.5 Municipal Wastewater Treatment Facilities and Discharges

There are 10 wastewater treatment facilities that discharge either directly into Cook Inlet, or into waters that flow into Cook Inlet, including AWPCF (NMFS 2019a). Wastewater entering these plants may contain a variety of organic and inorganic pollutants, metals, nutrients, sediments, bacteria and viruses, and other EPOCs. In addition to AWPCF, four of these treatment plants discharge into upper Cook Inlet waters (north of the Forelands): Eagle River, Palmer, Girdwood, and Tyonek (refer to **Figure 4-18**).

Figure 4-18. Locations of Other Wastewater Treatment Plants, Ted Stevens Anchorage International Airport, and Port of Alaska Relative to Asplund WWTF

Wastewater from the MOA and Tyonek receive primary treatment; wastewater from Palmer receives secondary treatment; and wastewater from Eagle River and Girdwood both receive tertiary treatment (Norman et al. 2015). Eagle River discharges approximately 506 million gallons of effluent per year, while the smaller Girdwood plant discharges 134 million gallons per year.[38] The Palmer treatment plant is owned by the City of Palmer and has a maximum flow rate of 547.5 million gallons of wastewater per year[39]; the Tyonek plant is much smaller and treats up to 35.6 million gallons per year.[40] AWPCF current operates at an average daily flow of approximately 30 million gallons per day and is rated for up to 58 million gallons per day (Kinnetic Environmental Inc. 2024a).

Currently, discharges from the Eagle River WWTF are covered by an individual permit (ADEC 2020a). Girdwood and Palmer are covered by EPA permits AK0047856 and AK0022497, respectively, while the Tyonek plant is covered by ADEC permit 8923DB007.

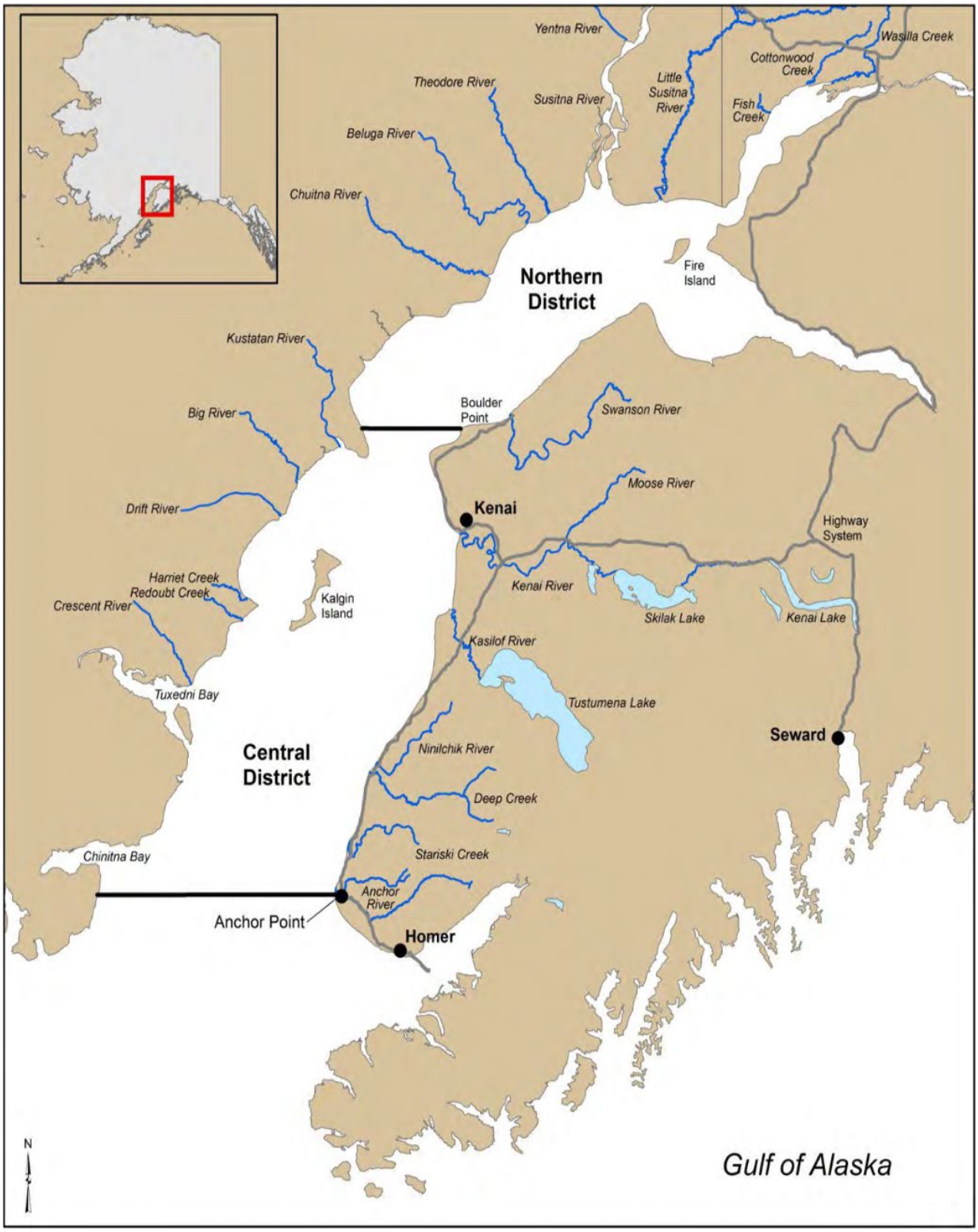
Discharges from WWTFs or urban runoff may contain a variety of organic and inorganic constituents, including metals, PCBs, pesticides, nutrients, and pharmaceuticals, that may end up in Cook Inlet waters (Norman 2011). Mixing zones for WWTFs authorized by these permits within the action area may exceed AWQS and/or NRWQC for pollutants such as ammonia, fecal coliform bacteria, TRC, copper, nutrients, pH, zinc, other metals, reductions in DO, and WET as well as limits for water temperature. Most contaminants entering Cook Inlet are likely to be diluted and dispersed by tides, estuarine circulation, wind-driven waves, and currents (Norman 2011). However, as has been noted in other regions with industrial and agricultural development near cities, runoff or discharges into large bodies of water have negatively impacted the water quality (Norman 2011).

4.4.6 Commercial, Recreational, and Subsistence Fisheries

There are eight commercially harvested species in the upper Cook Inlet Management Area north of Anchor Point. The management area is divided into the Northern and Central Districts. The Northern District, located north of Boulder Point north of the Forelands, is the only area considered to be close to the AWPCF action area for the NPDES permit (refer to **Figure 4-19**).

[38] https://www.awwu.biz/about-us/awwu-overview Accessed August 2, 2024
[39] https://aws.state.ak.us/OnlinePublicNotices/Notices/View.aspx?id=217516 Accessed May 22, 2025
[40] https://dec.alaska.gov/Applications/Water/OpCert/Home.aspx?p=SystemSearchRecord&d=240472&search= Accessed May 22, 2025

Figure 4-19. Upper Cook Inlet Fishery Management Area District Boundaries and Major Tributaries



Source: Lipka and Stumpf (2024)

All five species of Pacific salmon (*Oncorhynchus* species) and smelt or eulachon (*Thaleichthys pacificus*) are commercially harvested in the Northern District of the Upper Cook Inlet Management Area. Salmon occur in most drainages throughout upper Cook Inlet, with the timing of runs for each species overlapping to some degree. Thus, commercial salmon fisheries are generally mixed stocks and species. Set gillnets are currently the only gear type allowed in the Northern District. In terms of economic value, sockeye salmon are the most valuable species in the upper Cook Inlet fishery management area, followed by chum, coho, pink, and Chinook (Lipka and Stumpf 2024). In 2022, approximately 1.4 million salmon were harvested, approximately 44% less than the 2012 to 2021 average of 2.5 million fish. Harvests for individual species and fishery district were variable. Sockeye represented 91% of the ex-vessel value and was $13.1 million in 2022, approximately 43% less than the average of $23.1 million for the period 2012 to 2021. In 2022, for all upper Cook Inlet, ex-vessel value for coho was $368,771, ex-vessel value for pink salmon was $110,691, and chum salmon was $461,507. Chinook salmon ex-vessel value was $93,632 in 2022. All salmon species' ex-vessel values were below the 10-year averages (Lipka and Stumpf 2024).

In 2022, sockeye salmon escapement was monitored with weir counts in the Susitna River drainage at Judd Lake (in the Yentna River) and at Larson Lake in the mainstem Susitna River. In addition, the Division of Sport Fish also monitored sockeye salmon escapement in 2022 at Fish Creek, Deshka River, and Little Susitna River as well as coho escapement in the Deshka and Little Susitna rivers in the Northern District. Sockeye counts fell within the goal ranges for three out of six sites and exceeded escapement goals at two sites. Approximately 51,831 sockeye salmon were harvested by 84 permit holders in the Northern District set gillnet fishery in 2022 (Lipka and Stumpf 2024).

The Alaska Board of Fisheries created the *Northern District King Salmon Management Plan* (5 AAC 21.366) in 1986. This plan now includes certain paired restrictions for the Deshka River sport Chinook fishery and the commercial Chinook fishery in the Northern District. In 2022, based on a closure of the sport Chinook salmon fishery in the Chinitna River, the commercial Chinook fishery was closed from the wood chip dock to the Susitna River, and the remainder of the Northern District Chinook salmon fishery was restricted to 6 hours per open period because of catch-and-release restrictions in the Deshka sport fishery. The 2023 commercial salmon fishing season in the Northern District of the upper Cook Inlet closed on September 14 that year. As of September 17, 2024, the period of this report, similar closures have occurred in 2024. For example, Emergency Order 2-KS-2-05-24 closed the Deshka River to king salmon sport fishing, with the area management biologist stating the 2023 escapements did "not improve this prolonged period of poor productivity".[41]

Smelt, an anadromous species also known as hooligan or eulachon, are harvested under the *Cook Inlet Smelt Fishery Management Plan* (5 AAC 21.505) from May 1 to June 30 in the marine waters of Cook Inlet, northeast of the Chuitna River to the Little Susitna River and in the Susitna River south of 61°21.41″ N latitude. The smelt fishery is the first anadromous fishery each year in this region. Hand-operated dip nets are the permitted gear for smelt, which has a total guideline harvest level of 200 tons of smelt or less. While longfin smelt return to Cook Inlet in the fall, because of the small run size and lack of demand there is no harvest at that time (Lipka and Stumpf 2024).

In addition to commercial fisheries, there is a Tyonek subsistence fishery as well as personal use fishery for salmon. The Tyonek subsistence fishery was mandated by an Anchorage Superior Court Order in May 1980. According to 5 AAC 01.560, *Fishing Seasons and Daily Fishing Periods*, there are two distinct periods for subsistence fishing in the Tyonek Subdistrict; the early season period is May 15 to June 15 and allows fishing every Tuesday, Thursday, and Friday, while the late-season period after June 15 allows

[41] https://alaska-native-news.com/sport-fishing-for-king-salmon-closed-in-cook-inlet-salt-waters/73006/; Accessed September 17, 2024.

fishing each Saturday. Both permits allow for 25 salmon per permit holder and 10 salmon for each additional household member. Salmon must be harvested using a single 10-fathom gillnet with mesh size no greater than 254 millimeters.

Personal use fishing allows for the same catch limits as the Tyonek subsistence fishery. Operating under the *Upper Cook Inlet Personal Use Salmon Fishery Management Plan* (5 AAC 77.540), dip net fisheries occur in the Beluga and Susitna rivers, and in Fish Creek within the Northern District (Lipka and Stumpf 2024). In 2022, for the entire upper Cook Inlet personal use fisheries, 54 Chinook, 485,005 sockeye, 3,581 coho, 5,871 pink, and 1,827 chum salmon were harvested. The majority of these fish were harvested outside of the Northern District in the Kenai River (Lipka and Stumpf 2024)

4.4.7 Seafood Processing Facilities and Discharges

There are currently a number of facilities on the east side of Cook Inlet that discharge seafood processing wastes. Seafood processing facilities include offshore processors (more than approximately 2 kilometers from shore), nearshore processors (between approximately 1 and 2 kilometers from shore), and shore-based processors (within approximately 1 kilometer from shore). Intentional discharges from these facilities are regulated by either the EPA or the ADEC (NPDES/APDES; Section 402 of the CWA). Authorized discharges from these facilities contain fish offal, "stickwater" (produced by modification of seafood from a raw to marketable form), wash-down water (includes approved disinfectants), sanitary wastewater, and other wastewaters (for example, cooking water, cooling water, live tank water) (EPA 2020a, 2021). EPA (2016a) noted that studies have found high BOD, oil and grease, and nitrogen concentrations characterize effluents from seafood processing facilities. Ammonia, chlorine, and other compounds may also be present in the discharge (EPA 2016a). In addition, biological degradation discharged offal can release chemical compounds such as ammonia or hydrogen sulfide, which can further deplete the oxygen in the water column.

There are no onshore seafood processing plants in upper Cook Inlet. Under the current general permit for offshore seafood processors (EPA 2021), certain waters in upper Cook Inlet are excluded from the discharge of seafood processing pollutants. The excluded upper Cook Inlet areas include waters within approximately 2 kilometers of the Anchorage Coastal Wildlife Refuge, Goose Bay State Game Refuge, Palmer Hay Flats State Game Refuge, and the Susitna Flats State Game Refuge. An operator wishing to discharge into receiving waters that are excluded from coverage may apply for an individual permit or, in some cases, may request a modification under the general permit. Both individual permits and modifications that allow seafood waste discharges in excluded areas include site-specific conditions and mitigation measures to avoid degrading or further degrading the receiving water quality.

Seafood processing facilities are directly associated with the fishing industry. Infrastructure associated with the fishing industry includes fishing vessel and barge traffic, fueling operations, vessel maintenance, and vessel mooring. This association increases the probability that petroleum hydrocarbons and other contaminants may be accidentally spilled into the marine environment in the vicinity of the seafood processing discharges. There is also the potential for chronic petroleum discharges from the boat traffic associated with the off-loading vessels.

4.4.8 Oil and Gas Activities and Discharges

Oil was discovered in 1957 in Cook Inlet.[42] By the late 1960s, 14 offshore oil production facilities were installed in upper Cook Inlet; most of the Cook Inlet platforms and much of the associated infrastructure is more than 40 years old (NMFS 2017a). **Figure 4-20** shows oil and gas activities in Cook Inlet by all existing and potential operators as of December 2023.

Cook Inlet oil production has declined from an average of 15,653 barrels per day in 2018 to an average of 9,033 barrels per day in 2023 (ADNR 2024). In March 2024, Cook Inlet natural gas production averaged 5,830,444 cubic meters (m^3) (205,653 million cubic feet [mcf]) per day, down slightly from a February average of 5,849,354 m^3 (206,568 mcf) per day and down 4.4% from a March 2023 average of 6,090,047 m^3 (215,068 mcf) per day.[43]

In recent years, EPA and ADEC have been working toward dividing EPA's 2007 general permit for Cook Inlet oil and gas extraction activities into separate general permits for federal and state waters and into separate general permits for exploration versus development and production activities. The agencies replaced the exploration components of the 2007 general permit with a general permit in 2015 (EPA 2015a). This permit expired in 2021 and was superseded by an APDES permit covering oil and gas exploration, development and production effective until December 31, 2026, for state waters of Cook Inlet (ADEC 2021).

The current APDES permit (ADEC 2021) generally allows discharges of drilling fluids and drill cuttings; deck drainage; domestic wastewater; graywater; desalination unit wastes; blowout preventer fluid; boiler blow-down; fire control system test water; noncontact cooling water; uncontaminated ballast water; bilge water; excess cement slurry; muds, cuts, and cement at the seafloor; waterflooding (filter backwash); produced water; completion fluids; workover fluids; well treatment fluids; other test fluids; and hydrostatic test water. The permit describes the limits and monitoring requirements for each discharge. Discharges are prohibited at certain locations such as within 4,000 meters of a coastal marsh or river delta and offshore of protected areas, including the Susitna Flats and Palmer Hay Flats State Game Refuges in upper Cook Inlet (ADEC 2021). A discharge to these areas would require authorization under an individual permit.

ADEC (2021) allows for the authorization of mixing zones for turbidity, aluminum, antimony, aromatic hydrocarbons, arsenic, barium, beryllium, cadmium, chromium, copper, fecal coliform bacteria, iron, lead, mercury, nickel, selenium, silver, thallium, TRC, zinc, and WET at levels that exceed the chronic AWQS and/or NRWQC. In addition to authorized discharges from oil and gas operations, there is the potential for petroleum leaks and spills (as well as for leaks, spills, or other unauthorized discharges of other pollutants) from platforms, pipelines, and tankers.

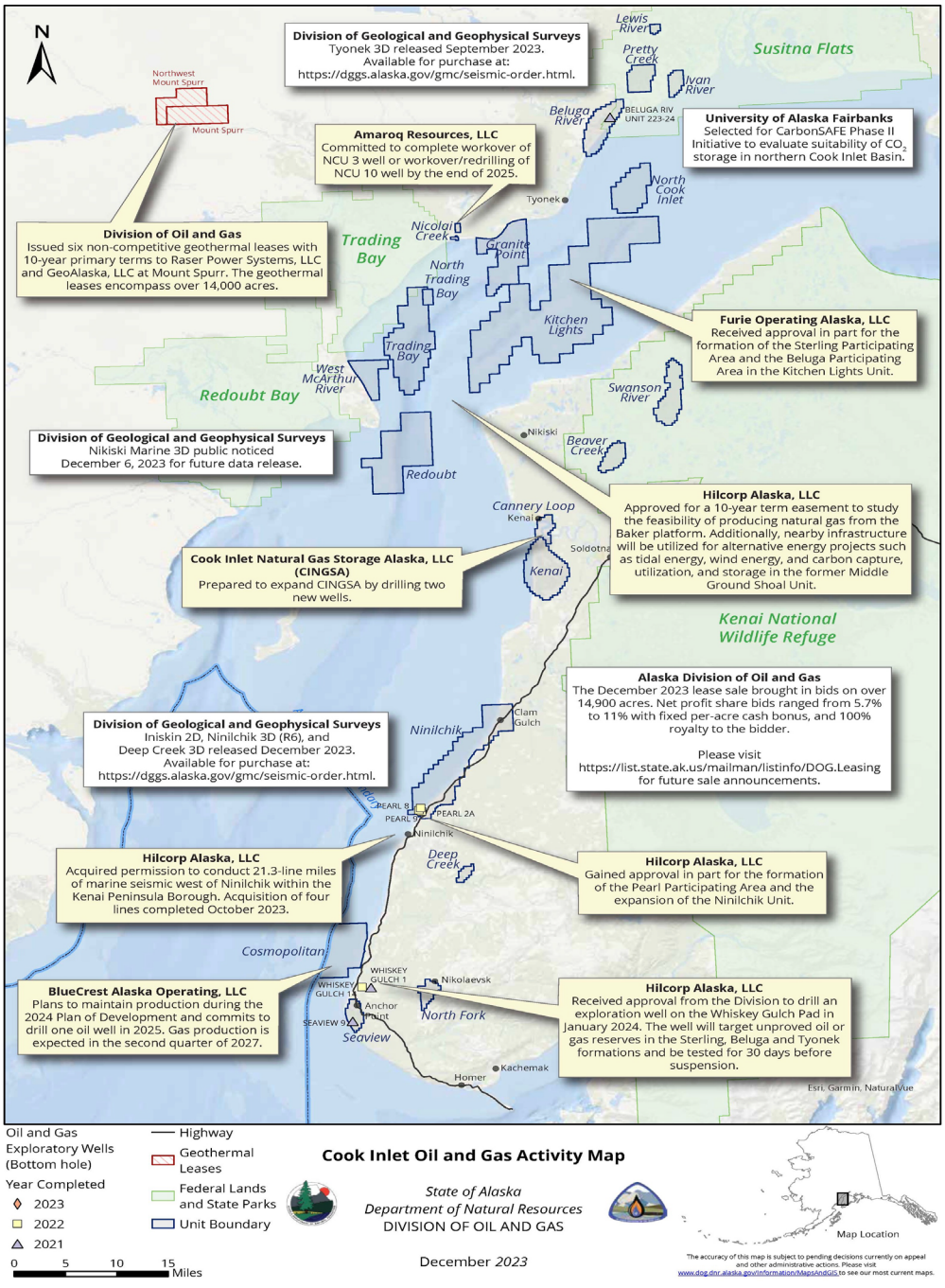
In addition to discharges, oil and gas infrastructure may also require repairs and maintenance. For example, Hilcorp conducts routine maintenance activities in an area approximately 65 kilometers south of the action area. Maintenance activities include subsea pipeline inspections, pipeline stabilization, and repair and replacement; platform leg inspections and repairs; and anode sled installations. Routine maintenance activities involve the use of a range of equipment and hand-held tools. A 2022 Letter of Concurrence from NMFS stated that the agency concurred with the determination that the proposed action may affect, but is not likely to adversely affect, fin whales, Western North Pacific DPS humpback

[42] https://dggs.alaska.gov/energy/cook-inlet.html#:~:text=Cook%20Inlet%20basin%20is%20a,most%20discoveries%20occurring%20before%201985 Accessed August 1, 2024

[43] https://www.petroleumnews.com/pntruncate/278672665.shtml. Accessed August 1, 2024.

whales, Mexico DPS humpback whales, Cook Inlet beluga whales, Western DPS Steller sea lions, or designated critical habitat for Cook Inlet beluga whales (NMFS 2022d).

Figure 4-20. Cook Inlet Oil and Gas Activity Map December 2023



Source: file:///Users/suebee1/Library/Mobile%20Documents/com~apple~CloudDocs/AWWU/BE%20working%20versions/working%20versions/Cook%20Inlet%20Activity%20Map.pdf. Accessed August 14, 2024.

4.5 Climate Change

Temperature anomalies, increasing ocean temperatures, fluctuations in ocean chemistry, and shifting weather patterns have led to ecosystem changes in recent years in the Gulf of Alaska (Litzow et al. 2020) and other oceans. In marine ecosystems, changes in temperature, ocean circulation, stratification, nutrient input, oxygen content, ocean acidification, and increased atmospheric carbon dioxide may have significant biological effects (Donney et al. 2012). Alaska is warming at two to three times the rate of the global average and instances of extreme precipitation have occurred, with Anchorage recording 26 days of rain in August 2022 and Girdwood recording the highest rainfall on record in 2021.[44] Frequent, heavy rain can cause erosion and landslides and increase levels of sediment and other materials or pollutants in waterbodies. These changes can affect multiple taxonomic groups and trophic levels. For example, a mass mortality event (62,000) of common murres in the Gulf of Alaska occurred in 2015 and 2016 (Piatt et al. 2020), an unusual mortality for humpback whales in the western Gulf of Alaska was documented in 2015, and fisheries harvests for Gulf of Alaska Pacific cod in 2018 and 2016 runs of pink salmon were reduced (Litzow et al. 2020).

During autumn 2013, an anomalously warm water mass began to form in the North Pacific and Gulf of Alaska caused by a lack of cyclonic storms that usually mix and subsequently cool the water column. Aptly named "the Blob," this warm water mass spread across the entire North Pacific in spring 2014, producing temperature anomalies of 3°C to 4.5°C that summer. This resulted in a complete replacement of the "cold water, lipid-rich" food chain with a "warm-water, lipid poor" food chain. By winter (January to March) 2015, the sea surface temperature pattern across the Pacific resembled the positive Pacific Decadal Oscillation pattern. This sea surface temperature pattern continued through 2016 and warm conditions were documented throughout the Gulf of Alaska through 2019 (Suryan et al. 2021). Effects in nearshore intertidal areas to offshore oceanic regions with abrupt changes across trophic levels were noted and many responses persisted up to at least 5 years after the onset of the heatwave. Given anticipated increases in marine heatwaves under current climate projections, it remains uncertain when or if the Gulf of Alaska ecosystem will return to a preheatwave state (Suryan et al. 2021).

4.5.1 Climate Change Effects on ESA-listed Marine Mammals

Certain marine mammal species may have greater ability than others to adapt to major climate shifts and ecosystem disturbances (Moore and Huntington 2008). Exactly how cumulative effects may impact specific marine mammal species in any given location is difficult to predict but the contribution of climate change to cumulative effects could range from minor to major depending on the specific species and the context of their exposure to other stressors. Changes in the distribution of prey species with particular thermal requirements may be the most likely effect of climate change on marine species in the action area (81 FR 62259). According to McLeod (2009), ranges of approximately 88% of cetaceans may be affected by changes in water temperature resulting from global climate change.

A method developed by Lettrich et al. (2019) to assess the vulnerability of marine mammals to climate changes uses existing information and expert knowledge to assess marine mammal stocks' exposure, sensitivity, and capacity to adapt to climate change and variability. Their method follows the model of the NOAA Fisheries *Marine Fish and Shellfish Climate Vulnerability Assessment* (Hare et al. 2016) and assesses exposure to climate change by scoring the projected change in climate conditions within a stock's current distribution. Sensitivity and capacity to adapt to climate change are then assessed based on the

[44] https://www.climatehubs.usda.gov/hubs/northwest/topic/alaska-and-changing-climate; Accessed October 7, 2024.

understanding of a stock's life history traits. A climate variability assessment is currently underway to assess the potential impacts of climate change on marine mammal populations in the Pacific.[45]

4.5.2 Climate Change Effects on Fish

Crowder et al. (2008) presented information on the global impacts of fisheries (that is, commercial, recreational, and artisanal) on marine ecosystems. Researchers have credited fishing with being one of the oldest and most significant factors modifying marine ecosystems (Jackson et al. 2001). Fishing, combined with other anthropogenic stressors such as warming ocean temperatures, has resulted in a loss of biodiversity (Worm et al. 2006).

A recent assessment of climate impacts on Pacific salmon was completed by (Crozier et al. 2019). While this assessment highlighted high risks from climate change for several endangered and threatened ESUs of salmon located outside the action area, the same potential effects may also impact the specific ESUs that occur in upper Cook Inlet. Changes in water temperatures and distinct flow conditions or water pathways are the characteristics that contribute to high vulnerability for these types of species (anadromous like salmon), making them particularly sensitive to climate change (Crozier et al. 2019). These include more extreme high and low flows and hotter oceans and rivers. Certain Chinook, coho, and sockeye salmon population groups are the most vulnerable to expected environmental shifts with climate change. Generally, populations within distinct ESUs are at most risk along the periphery of the ESU range, especially in interior and southern regions of the Pacific Northwest (Crozier et al. 2019), although these changes may also affect Pacific salmon ESUs in Cook Inlet.

Fully understanding how climate change will affect fish species in the future will require additional research; however, based on current research, climate change may include changes to fish habitat caused by warming ocean temperatures, decreased habitat for selected species, changing distributions and abundance, and changes in productivity and reproduction.

[45] https://www.fisheries.noaa.gov/national/climate/climate-vulnerability-assessments, Accessed October 7, 2024

5. Description of ESA-Listed Species and Their Habitats

This section describes ESA-listed and ESA candidate species that are (1) likely to be encountered in the action area; (2) infrequent in the action area; and (3) rarely encountered in the action area. Species-specific information, including the potential frequency of occurrence within or near the action area, time frame or duration of occurrence, whether critical habitat has been designated, and other information related to federal listing and state conservation status is provided in **Tables 5-1, 5-2,** and **5-3**. Additional details regarding species expected to be rarely encountered in or near the action area are provided in **Appendix E.**

5.1 ESA-Listed Species in the Action Area

Beluga whales from the Cook Inlet DPS are the only ESA-listed species likely to be encountered in or near the action area of upper Cook Inlet. **Table 5-1** summarizes specific information regarding their abundance, presence in the area, federal and state listing status, and citations for the information provided.

Beluga whales are known for their white color and range of vocal sounds; they are very social animals, forming groups to hunt, migrate, and interact.[46] Beluga whales are found globally throughout Arctic and sub-Arctic waters. They frequent coastal bays and inlets and move between salt and freshwater habitats. Beluga whales have a thick layer of blubber and thick skin that allows them to survive in cold water. Belugas also lack a dorsal fin and can easily navigate between ice floes (NMFS 2022b).

5.1.1 Beluga Whales – Distribution, Local Movements, and Occurrence Near Point Woronzof

5.1.1.1 General Geographical and Seasonal Distribution

Five stocks of beluga whales are recognized in Alaska: (1) Beaufort Sea stock, (2) Eastern Chukchi Sea stock, (3) Eastern Bering Sea stock, (4) Bristol Bay stock, and (5) Cook Inlet stock (Young et al. 2023). Of these stocks, only the Cook Inlet stock is listed under the ESA. Cook Inlet beluga whales are geographically and genetically isolated from other beluga whale stocks in Alaska (Young et al. 2023), and the stock is recognized as a DPS under the ESA. The degree of genetic difference between the Cook Inlet beluga DPS and other beluga whale stocks indicates that they have been isolated and genetically distinct for several thousand years (O'Corry-Crowe et al. 1997).

Historically, beluga whales have been distributed throughout Cook Inlet, with occasional sightings in the Gulf of Alaska (Huntington 2000, Laidre et al. 2000, Moore et al. 2000, Rugh et al. 2000). However, in the 2000s, the range of the Cook Inlet beluga whale contracted to mostly the upper and middle waters of Cook Inlet (Shelden et al. 2018).

[46] https://www.fisheries.noaa.gov/species/beluga-whale Accessed January 9, 2024

Table 5-1. ESA-Listed Species in the Action Area

					Migratory Species?		Critical Habitat			
Species	**Current Abundance**	**Federal Management Entity and Listing Status**	**State of Alaska Status**	**Frequency of Occurrence In or Near Action Area**	**Y/N**	**Time Frame/ Duration In or Near Action Area?**	**Designated? (Y/N)**	**Located In or Near Action Area? (Y/N)**	**Notes**	**References**
Beluga Whale *Delphinapterus leucas* Cook Inlet DPS	331	NMFS Endangered	▪ Species of Conservation Need ▪ Stewardship Species ▪ Culturally Important	Frequent	N	April to December. During April and May beluga concentrations correspond with eulachon migrations to rivers and streams in the northern portion of upper Cook Inlet. They are most common from August through September near Point Woronzof, but densities are low. Sighting frequency in the vicinity of Point Woronzof declines after October and drops to 0 during the winter months, increasing again during the spring and summer months. From January into March, belugas move south of Kalgin Island into central Cook Inlet offshore waters.	Y	Y	The 2022 Final Alaska Marine Mammal Stock Assessment Report (SAR) estimated an abundance of 279 (CV = 0.061) and Potential Biological Removal (PBR) of 0.53 based on a weighted average from annual estimates in 2014, 2016, and 2018. However, Goetz et al. (2023) estimated abundance based on video and counting passes from late June 2021 and early June 2022. The authors recommend that 331 be considered the official best estimate for this population and note that there is 65.1% probability that the population is now increasing at 0.9% per year. Belugas can be found throughout Cook Inlet at any time of year but tend to spend the ice-free months in upper Cook Inlet and move into the mid- and lower Inlet in the winter.	ADF&G (2015) Angliss and Outlaw (2005) Hobbs et al. (2005) Funk et al. (2005) Polasek et al. (2015) Rugh et al. (2010) McGuire et al. (2020) NMFS (2016b) Young et al. (2023) Goetz et al. (2023) 73 FR 62919 76 FR 20180

While beluga whales remain in the inlet year-round, there are seasonal shifts in their distribution generally influenced by prey availability, ice coverage, and peak river discharge events (Goetz et al. 2012, Hobbs et al. 2005, Rugh et al. 2010, Shelden et al. 2017, Shelden et al. 2013). During the ice-free months, belugas are concentrated near upper Cook Inlet river mouths, dispersing and moving into middle and lower Inlet waters during the winter (Polasek et al. 2015, Shelden et al. 2015). The surge of eulachon in April and May, and salmon in May and again in July through October, draws Cook Inlet belugas to important foraging areas near river mouths in upper Cook Inlet during these ice-free periods (McGuire et al. 2020, Moore et al. 2000, Quakenbush et al. 2015b).

For nearly two decades in Cook Inlet, land-, aerial- and vessel-based monitoring programs as well as acoustic monitoring for Cook Inlet beluga whales have been undertaken by the oil and gas industry, the Port of Alaska (formerly Port of Anchorage), and other entities (61 North Environmental 2020e, f, g, a, b, c, d, Blackwell and Greene Jr. 2003, Castellote 2019, Castellote et al. 2019, CH2M Engineers Inc. 2016, Corporation 2013, Fairweather Science LLC 2018, HDR Alaska Inc. et al. 2006, Integrated Concepts & Research Corporation 2009, 2010, 2012, Lammers et al. 2013, Prevel Ramos et al. 2006, SAExploration 2012, Scientific Fishery Systems and Alaska Native Technologies 2008, Sitkiewicz et al. 2018, URS 2007).

During 21 monitoring events from 2005 to 2017, belugas (n = 100) were observed at or near low tide in Chickaloon Bay (approximately 30 kilometers south of Point Woronzof and the action area) in August and September, then moving along the south shore of Turnagain Arm with the incoming tide (McGuire et al. 2020). On average, fewer than 25 belugas were observed in the immediate vicinity of Point Woronzof and only during July and August of this period (McGuire et al. 2020) (**Figure 5-1**).

Castellote et al. (2020a) conducted a year-round passive acoustic monitoring program during the period 2008 to 2013 at 13 locations within the Cook Inlet beluga whale critical habitat in upper Cook Inlet (refer to **Section 5.1.6** for a description of designated Cook Inlet beluga whale critical habitat). The authors identified seasonal beluga occurrence patterns across all years at most monitoring locations. Detections were higher in the upper Inlet during summer months, peaking in known concentration areas. However, the occurrence of beluga whales in the upper Cook Inlet at peak ice coverage during the winter months was observed more frequently than suggested by earlier studies (Castellote et al. 2020a). **Figure 5-2** shows the normalized acoustic presence of beluga whales in the vicinity of the action area during summer and winter.

Castellote et al. (2024) published results from acoustic moorings deployed September 2021 through May 2022 to collect data on the potential presence of beluga whales during winter months in lower Cook Inlet, namely Tuxedni and Chinitna bays, approximately 175 kilometers and 220 kilometers south of Point Woronzof (the action area), respectively. These sampling locations also included data collection in the Tuxedni River and Chinitna River. Chinitna locations had very low presence of Cook Inlet beluga whales based on recordings collected from the acoustic moorings. From September 2021 through April 2022, belugas were recorded in Tuxedni locations, primarily during September and October in the river and during January, February, and March in the bay (Castellote et al. 2024).

Sitkiewicz et al. (2018) conducted marine mammal monitoring during Hilcorp's Cross Inlet Pipeline project near the Tyonek platform in middle Cook Inlet, approximately 50 km southwest of the AWPCF action area. From May 9 to September 15, 2018 (more than 3,000 hours of monitoring), 143 sightings of beluga whales were observed in that area (well outside of the AWPCF outfall and ZID boundary).

During the period 2005-2022, aerial surveys documented beluga whales near Fire Island, located approximately 8.5 km east of Point Woronzof (Shelden et al. 2022, Shelden and Wade 2019, Shelden et

al. 2013). June observations represented the highest daily count as shown in the following list. No surveys were conducted in 2013, 2015, 2017, or 2020.

- 2005 – 47
- 2006 – 0
- 2007 – 2
- 2008 – 0
- 2009 – 0
- 2010 – 9
- 2011 – 2
- 2012 – 0
- 2014 – 0
- 2016 – 0
- 2018 – 0
- 2021 – 0
- 2022 – 4

Aerial surveys conducted by NMFS in 2021 documented between 0 and 6 beluga whales in Knik Arm from June 22 to July 1. Based on military aircraft activity in the area on June 22, 2021, the aerial survey was not able to circle in Knik Arm when 1 whale was sighted; thus, it is possible additional whales were in Knik Arm that day (Shelden et al. 2022). For comparison, the same aerial survey effort documented between 36 and 143 beluga whales across the inlet near the Susitna Delta (Shelden et al. 2022), approximately 30 kilometers west of Point Woronzof. In 2022, NMFS aerial surveys documented 0 Cook Inlet belugas in Knik Arm while across Cook Inlet in the Susitna River Delta, between June 6 and June 18, from 103 to 197 belugas were sighted (Shelden et al. 2022), indicative of the high prey densities (salmon) on the west side of the inlet.

Wade et al. (2024) is compiling data from boat-based biopsy surveys of Cook Inlet beluga whales conducted from 2017 to 2019. While the compilation of biopsy results is not yet available, the field report (Wade et al. 2024) provides information on the presence of belugas in the vicinity of the action area. Biopsy surveys were conducted in July, August, and September during low tide in beluga high-use habitats, including Knik Arm, the Susitna River Delta, and Chickaloon Bay. One survey was conducted in 2017 (September 2 to 9), and two surveys each were conducted in 2018 (July 23 to 31 and September 6 to 14) and 2019 (August 27 to September 3 and September 10 to 14). During the five biopsy surveys, 62 groups of beluga whales were observed. **Figure 5-3** shows the survey tracklines and documents all beluga group sightings during the five biopsy surveys. As seen on **Figure 5-3**, most of the beluga sightings occurred in the upper reaches of Knik Arm, Chickaloon Bay, and near the mouth of the Susitna River; however, on September 9, 2017, a group of 15 beluga whales was observed close to shore in a rocky area immediately south of Point Woronzof (Wade et al. 2024).

5.1.1.2 Beluga Occurrence Near the Point Woronzof Action Area

Based on Marine Mammal Laboratory aerial survey data from 2000 to 2018, an average of 162 Cook Inlet belugas was observed near the Susitna Delta (North Foreland to Point MacKenzie) compared to an average of 2 beluga whales observed near Fire Island, the closest observation point to the action area (although still 8.5 kilometers away at the nearest point). These data illustrate that Cook Inlet beluga whales are primarily across and farther north in the inlet in areas of higher prey densities.

As reported by Funk et al. (2005), beluga sightings were recorded during the summer months near Point Woronzof and were most common from August through September, but sighting rates were low (<1 whale per 20-minute observation period). In October and November, beluga whales have been documented

moving between Knik Arm,[47] Turnagain Arm, and Chickaloon Bay (Hobbs et al. 2005), potentially passing through or near the action area. Sighting frequency in the vicinity of Point Woronzof begins to decline after October and drops to 0 during the winter months (Funk et al. 2005). From January into March, belugas move farther away from the action area, transiting south to Kalgin Island and slightly beyond in central Cook Inlet offshore waters (Hobbs et al. 2005). During the winter months, they also move toward shallow waters along the western shore of Cook Inlet, as far south as Kamishak Bay (Nemeth et al. 2007).

Belugas have also been observed near the Port of Alaska, which is 8 km northeast of Point Woronzof. To meet the requirements of an IHA authorization, monitoring for marine mammals in the vicinity of the port was conducted during construction work in 2020 (61 North Environmental 2020f, b, g, a, e, d, c, 2021). The IHA required monitoring four locations:

- Point Woronzof (PWS Station)
- Near the boat launch at Ship Creek (SC Station) - about 6.5 km northeast of Point Woronzof
- At the Petroleum and Cement Terminal (PCTS Station) - about 7.5 km northeast of Point Woronzof
- At the northern end of the port (NEX Station) - about 8 m northeast from Point Woronzof

Monthly total beluga observations from all observation points were:

- April – 11 groups; 33 individuals
- May – 35 groups; 168 individuals
- June – 33 groups, 114 individuals
- July – 12 groups, 25 individuals
- August – 56 groups 274 individuals
- September – 73 groups, 276 individuals
- October – no belugas sighted
- November – 25 groups, 97 individuals

5.1.1.3 Beluga Behavior Near the Point Woronzof Action Area

Groups consisting of both sexes and all age classes have been observed rearing calves and feeding in upper Cook Inlet, where they generally remain until July or later (Moore et al. 2000, Shelden et al. 2019). McGuire et al. (2020) compiled the locations of beluga whale groups observed with or without calves using observational data from 2005 to 2017. As shown on **Figure 5-4**, beluga calves were observed to the east of Point Woronzof near the Fish Creek estuary and to the southwest of the action area near Fire Island and between the mainland and Fire Island. Specifically related to the action area near Point Woronzof, Funk et al. (2005) suggested that belugas do not feed near Point Woronzof.

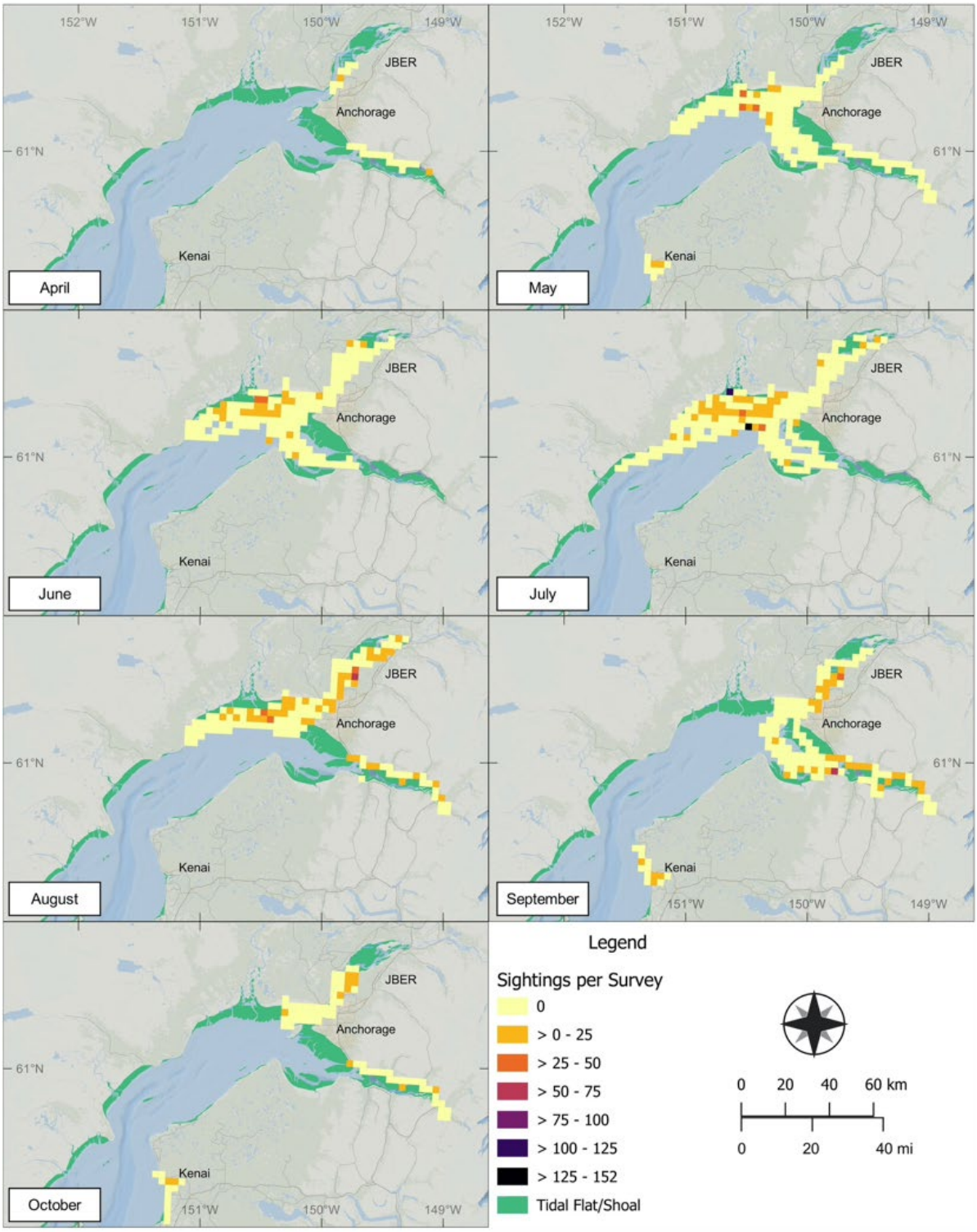
5.1.2 Beluga Whales – Abundance and Trends

The best historical estimate of Cook Inlet beluga abundance is derived from a 1979 survey, which estimated a total population of 1,293 belugas (Calkins 1989). Systematic abundance surveys of Cook Inlet beluga whales were not conducted prior to the mid-1990s; the Marine Mammal Laboratory began conducting systematic aerial surveys to monitor the abundance and trends of the population in 1994

[47] Point Woronzof is located near the mouth of Knik Arm.

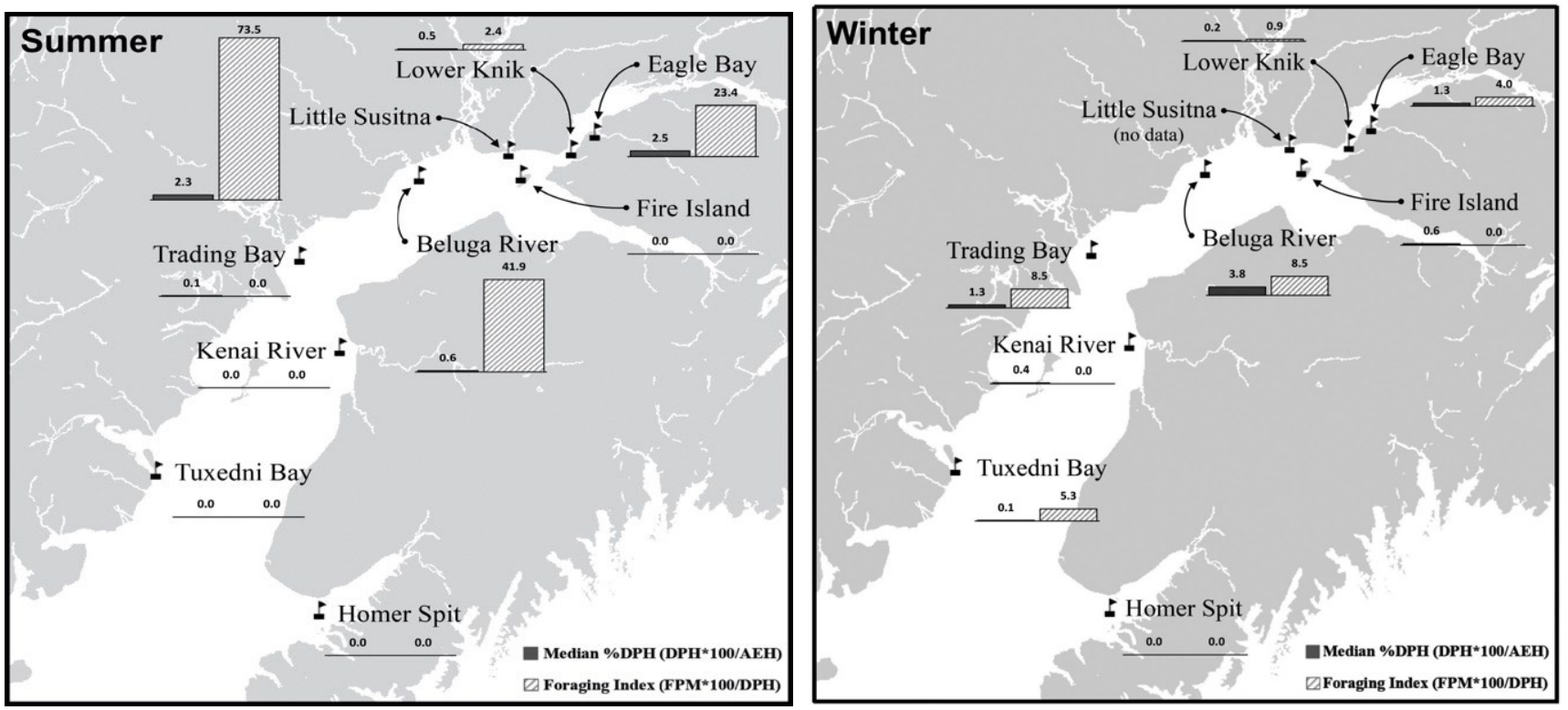
(Wade and Shelden 2023). These systematic surveys showed a decline in Cook Inlet beluga abundance from 653 individuals in 1994 to 347 belugas in 1998 (NMFS 2019b).

Figure 5-1. Average Counts of Beluga Whales in Cook Inlet per Survey by Month, 2005 to 2017.



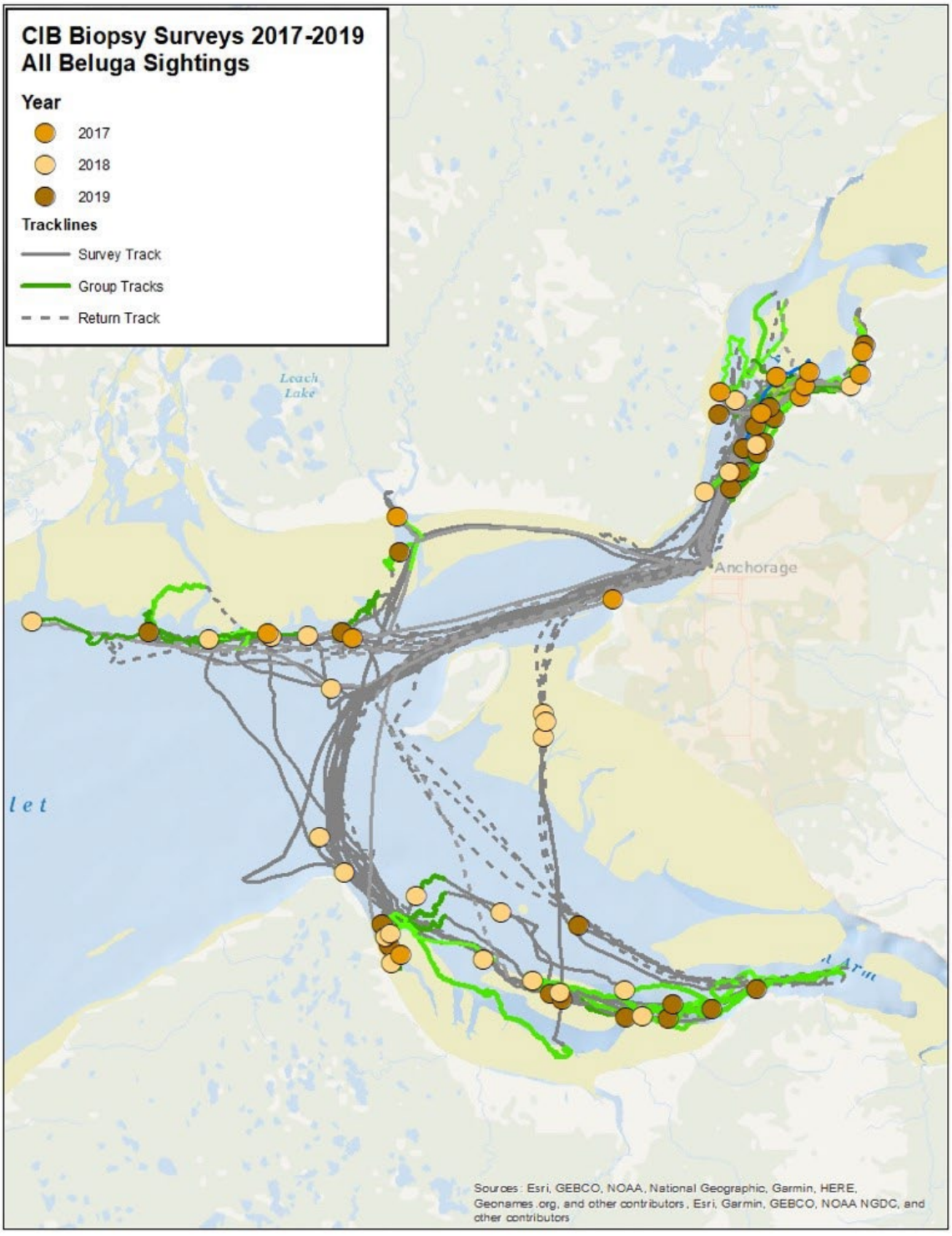
Source: McGuire et al. (2020)

Figure 5-2. Normalized Beluga Whale Acoustic Presence Near the Action Area



Source: Castellote et al. (2020a)

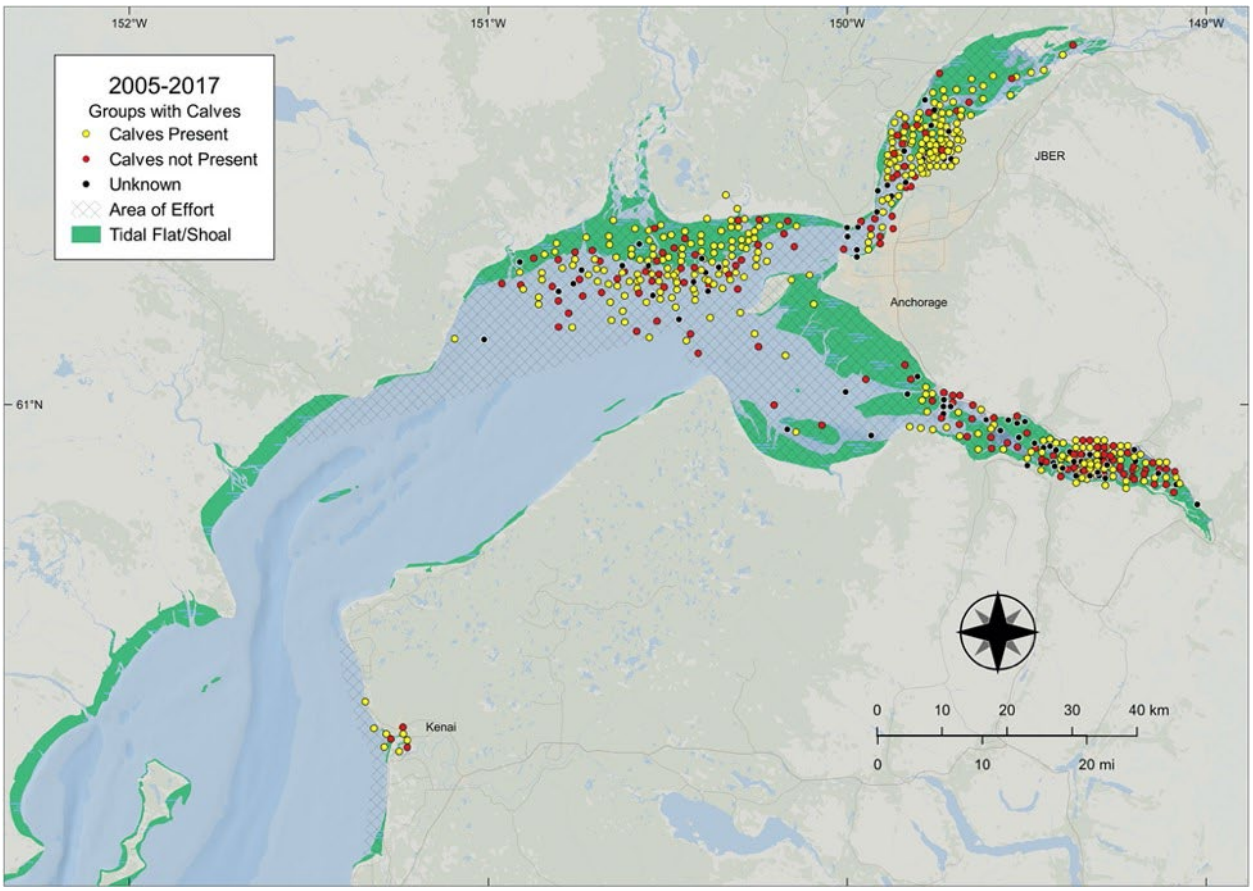
Figure 5-3. Biopsy Survey Tracklines and Beluga Whale Sightings 2017-2019



Source: Wade et al. (2024).

Note: Gray lines are biopsy survey tracks searching for whales. Gray dashed lines are return tracks at the end of each day's survey. Green lines (Group tracks) are the boat tracks while with whales during biopsy operations.

Figure 5-4. Locations of Beluga Whale Groups Observed with Calves, Without Calves, or Unknown 2005 to 2017

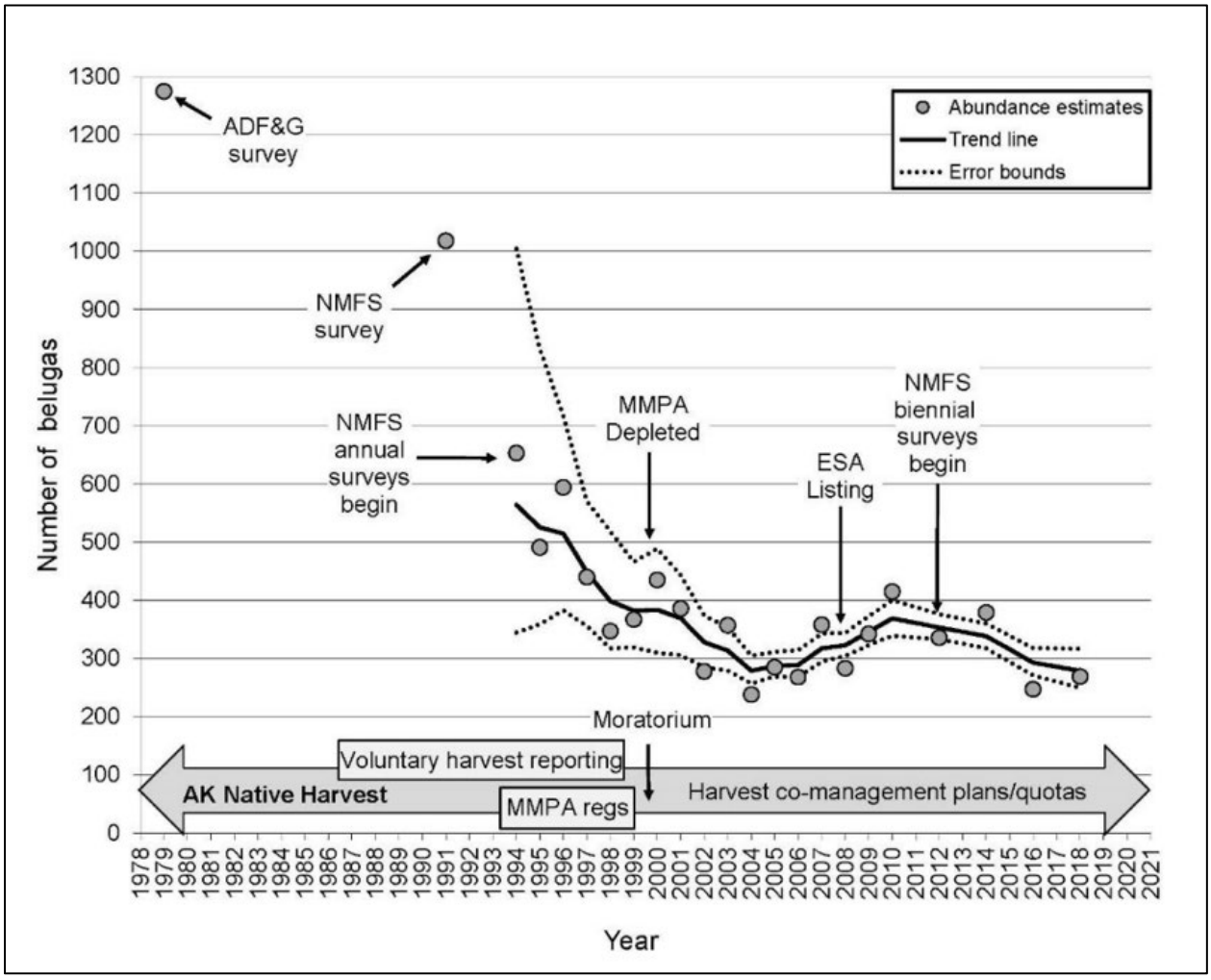


Source: McGuire et al. (2020)

As shown on **Figure 5-5**, the Cook Inlet beluga population declined steadily while hunting was unregulated, with peak hunting mortality occurring in 1996 (123 whales). Only five whales were reported killed from hunting from 1999 to 2005, but the population continued to decline until approximately 2004. The population then showed an increase from 2005 to 2010, but it continued to decline after 2010. Based on the continuing population decline, subsistence hunting of Cook Inlet beluga whales was suspended in 2006, and the population was expected to recover at a rate of 2% to 6% per year (Hobbs et al. 2008). This rate of recovery was not observed and the population continued to decline at a rate of 1.3% per year between 1999 and 2012 (Hobbs et al. 2015). From 2008 to 2018, the population of Cook Inlet belugas experienced a decline of approximately 2.3% per year (95% PI: -4.1% to -0.6%) (Wade et al. 2019). However, a slight increase (0.2 percent) in the population was documented by scientists based on

an analysis for the 10-year period including 2018 to 2022[48] (Goetz et al. 2023). Subsistence hunting of the population remains suspended.

Figure 5-5. Annual Cook Inlet Beluga Abundance Estimates 1979 – 2018



Source: Young et al. (2023)

Note: Annual abundance estimates (circles) of beluga whales in Cook Inlet, Alaska, 1979 to 2018 (Calkins 1984, Hobbs et al. 2015, Shelden and Mahoney 2016, Wade et al. 2019). The solid line from 1994 to 2018 is a weighted moving average of the abundance estimates that represents the smoothed trend of the population through time. Dashed lines above and below the solid line are 95% probability intervals around the smoothed trend line. Changes to harvest reporting are shown along the x-axis and indicate periods when Alaska Native hunting households provided data to the Alaska Department of Fish and Game, Alaska Beluga Whale Committee, Cook Inlet Marine Mammal Council, and NMFS and when Marine Mammal Protection Act harvest reporting regulations and co-management plans were adopted.

Beluga whales have been less aggregated in recent years, which increases the difficulty in collecting video data used to estimate absolute group size during traditional surveys. Traditional survey methods include a coastal transect of all nearshore waters and offshore tracklines that typically follow a sawtooth pattern

[48] https://www.fisheries.noaa.gov/feature-story/new-abundance-estimate-endangered-cook-inlet-beluga-whales#:~:text=June%2015%2C%202023,2008%E2%80%932018%20in%20population%20abundance; accessed December 3, 2024.

from the upper inlet to the entrance of Cook Inlet (Wade and Shelden 2023). Line-transect methods are more practical when assessing dispersed whales. For example, if the survey is not flown at low tide, the whales tend to be dispersed in the Susitna Delta into smaller, scattered groups. Because some groups may be missed during the traditional surveys, researchers established *ad hoc* rules to discard survey days that were too low by calculating the annual estimate of abundance as the average of 3 or more days, excluding a day's estimate if it was less than approximately 60% of the highest day (Hobbs et al. 2015). However, it is not possible to objectively determine if one specific estimate was low because a group was missed (in which case the estimate should be dropped) or if it was low because of sampling and model error as part of the estimation process (in which case it should not be dropped) (Young et al. 2023). Therefore, the traditional survey is subject to criticism that groups may be missed, particularly if whales move offshore away from the coast; quantitative methods have not been established to fully correct for this sample bias (Wade and Shelden 2023).

To better address the issue of missed groups and dispersed whales, the annual abundance presented in Young et al. (2023) is calculated as the median of all the daily abundance estimates, using all days with an acceptable survey day, which is defined objectively by weather/sighting conditions and spatial coverage. Using the median lessens the influence of strong positive and negative outliers. Following this method, as reported in the 2022 Final Alaska Marine Mammal SAR (Young et al. 2023), the point estimate of abundance (based on the median of all acceptable daily estimates), is 279 (Coefficient of Variance [CV] = 0.061) and a PBR of 0.53 for the Cook Inlet DPS. These numbers are based on a weighted average from annual estimates in 2014, 2016, and 2018 (Shelden and Wade 2019).

During surveys conducted in 2022, compete coverage of upper Cook Inlet was obtained on 3 days; daily overall observer count medians ranged from 186 to 224 whales (Shelden et al. 2022). This annual median index count of 224 whales in upper Cook Inlet fell within the range of median counts collected to date. The most recent abundance estimate for the DPS was calculated by Goetz et al. (2023) based on video and counting passes conducted during late June 2021 and early June 2022. Goetz et al. (2023) recommend that 331 be considered the official best estimate for this Cook Inlet population and note that there is 65.1% probability that the population is now increasing at 0.9% per year.

5.1.3 Beluga Whales – Status and Risks

5.1.3.1 Status of the Population

In 1998, in response to the decline in Cook Inlet beluga abundance, NMFS initiated a status review of the DPS (63 FR 64228) and, in 1999, NMFS received several petitions to list Cook Inlet beluga whales as endangered under the ESA (65 FR 17347). At that time, Alaska Native hunters were harvesting more than 50 Cook Inlet beluga whales per year (Mahoney and Shelden 2000). NMFS determined the population decline was caused by overharvest and because the subsistence harvest was regulated in 1999, NMFS subsequently determined that listing this stock under the ESA was not warranted at the time (65 FR 38778).

However, in 2000, NMFS designated the Cook Inlet beluga whale population as depleted under the Marine Mammal Protection Act (MMPA) (65 FR 34590; (NMFS 2000)) because the minimum population estimate of 283 animals was only 36% of the estimated minimum optimum sustainable population (OSP)of 780 whales (NMFS 2016b). Section 3(9) of the MMPA (16 U.S.C. 1362(9)) defines OSP as " …the number of animals which will result in the maximum productivity of the population or the species, keeping in mind the carrying capacity of the habitat and the health of the ecosystem of which they form a constituent element" (also refer to 50 CFR 216.3)." OSP reflects trends in both the abundance of a population and its condition relative to habitat carrying capacity. OSP can be back-calculated based on an estimate of the

populations maximum net productivity level or by conducting a dynamic response analysis (Gerrodette and Demaster 1990). The number of Cook Inlet beluga whales in the population is below historical levels (Young et al. 2023). As described in NMFS (2000), ideally NMFS would determine whether a population is depleted by comparing the carrying capacity of the population to the maximum net productivity level. However, since the carrying capacity of the Cook Inlet beluga whale DPS is unknown, NMFS made the determination in the 2000 rule that K was assumed to be the highest of NMFS's abundance estimates, in this case the 1994 estimate of 653 animals (NMFS 2000). Since listing the Cook Inlet beluga whale population as depleted under the MMPA in 2000, OSP remains unchanged (NMFS 2016b).

On October 22, 2008, NMFS listed the population as endangered under the ESA (73 FR 62919). NMFS designated critical habitat for Cook Inlet beluga whales on April 8, 2011 (76 FR 20180). The most recent 5-year status review for the Cook Inlet beluga whale DPS was completed in August 2022 (NMFS 2022b). The review concluded that based on the available new information and existing conservation and management measures, the Cook Inlet beluga whale DPS should retain its status as endangered. The Cook Inlet beluga whale population is below historical levels and for unknown reasons, is not increasing despite the discontinuation of the subsistence harvest since 2007 and likely low levels of serious injury or mortality from commercial fisheries interactions. Other sources of human-caused serious injury or mortality such as vessel strikes or entanglements have not been determined; however, as stated in NMFS (2000), it appears the lack of increase in the range of 2% to 4%, which is needed to increase the population (7 to 13 whales per year), is a key reason for the population remaining listed as endangered.

5.1.3.2 Risks to the Population

The most recent 5-year status review for the Cook Inlet beluga DPS summarized potential threats and determination of relative concern for the DPS (NMFS 2022b). The review identified potential threats with high relative concern to be catastrophic events such as natural disasters, spills, and mass strandings; cumulative effects; and disturbance from underwater sound. Threats determined of medium concern were disease agents such as pathogens, parasites, and harmful algal blooms; habitat loss or degradation; reductions in prey; and unauthorized takes. Threats of low concern were identified as exposure to contaminants, predation, and subsistence hunting.

Norman et al. (2022) systematically reviewed published literature on Cook Inlet beluga whales and selected surrogate species (St. Lawrence beluga, Hector's dolphins, and southern resident killer whales) to identify gaps associated with threats described and ranked in the Cook Inlet beluga whale recovery plan and recent 5-year status review (NMFS 2016b, 2022b). The authors determined that except for underwater sound, threats identified as high concern to the recovery of Cook Inlet belugas are of lower concern for surrogate species. Conversely, medium or low threats to Cook Inlet belugas, such as prey reduction and contaminants, respectively, are identified as higher priority threats in surrogate populations (Norman et al. 2022). Cook Inlet beluga whales also face natural threats such as mass strandings and predation events (McGuire et al. 2020).The following subsections discuss these and other potential threats to the Cook Inlet beluga population.

Ship Strikes and Entanglement: Although not specifically cited as a threat in the most recent 5-year Cook Inlet beluga status review (NMFS 2022b), Young et al. (2023) note that direct mortality or serious injury from ship strikes or entanglement in fishing gear are also potential risks or threats to the Cook Inlet beluga whale population. These encounters may cause serious injury or mortality and may or may not be considered authorized takes depending on the circumstances of the encounter. Freed et al. (2023) documents that no mortality or serious injuries occurred to Cook Inlet beluga whales during the period 2017 to 2023 from ship strikes or entanglements. However, according to Young et al. (2023), historical reports have shown that mortality and serious injury of Cook Inlet beluga whales occurred in the Cook Inlet

salmon set gillnet and drift gillnet fisheries. Because these fisheries do not currently employ fisheries observers (Young et al. 2023), the potential for fisheries-caused mortality and serious injury may be greater than is what is reflected in Freed et al. (2023).

Predation by Killer Whales: Shelden et al. (2003) assessed the effects of killer whale predation on Cook Inlet beluga whales and the implications of predation on their continued decline. The authors accounted for 21 belugas killed by killer whales in Cook Inlet between 1985 and 2002, suggesting a minimum predation rate of approximately one Cook Inlet beluga per year; this rate does not include at least three instances where beluga calves accompanied an adult that was attacked (Hobbs et al. 2015, Norman et al. 2015). Matkin (2011) concluded that predation events by killer whales in upper Cook Inlet are rare and transient killer whales (mammal eating) typically observed in lower Cook Inlet are not involved in predation events in upper Cook Inlet. It is unclear where the killer whales implicated in upper Inlet predation of belugas originate, nor is it known how frequently they enter the inlet. However, based on the infrequent sightings of killer whales in the upper Inlet, it is unlikely these whales remain in the region for extended periods (Matkin 2011).

Subsistence Hunting: Young et al. (2023) discusses the effects of subsistence hunting as a risk to the population. As noted in **Section 5.1**, subsistence harvests of Cook Inlet beluga whales have been suspended since 2006. A long-term harvest plan was signed in 2008 and established a harvest level for a 5-year period. The harvest level is based on the average Cook Inlet beluga abundance during the previous 5-year period and the growth rate during the previous 10-year period (NMFS 2008b). A harvest is not allowed if the previous 5-year average abundance was less than 350 beluga whales. The average abundance for the review period (2013 to 2017), using the 2014 and 2016 estimates, was still less than 350 whales (Wade et al. 2019), and a subsistence harvest was not allowed for the 2018 to 2022 period. The 2022 Final Alaska Marine Mammal SAR documented an estimated abundance of 279 Cook Inlet beluga whales (Young et al. 2023) and Goetz et al. (2023) recommend that 331 be considered the official best estimate for the Cook Inlet beluga whale DPS. These population estimates indicate that the moratorium on subsistence hunting of Cook Inlet beluga whales will continue for the foreseeable future.

Disease and Exposure to Contaminants: Regarding diseases in Cook Inlet belugas, Burek-Huntington et al. (2022b) studied congenital defects and herpes virus infections in a Cook Inlet beluga whale calf and an aborted beluga fetus. The authors note that congenital defects had not been reported to date in Cook Inlet beluga calves but describe the congenital defects potentially attributable to herpes virus exposures in the aborted fetus and male calf. The virus could have been acquired through uterine infection or in the case of the male calf during birth (Pinninti and Kimberlin 2018). In many cetaceans, including belugas, herpes viruses are associated with skin or mucosal lesions (Leger et al. 2018, Nielsen et al. 2017). Whether viral infection is related to the birth defect is unknown; however, other herpes viruses are known to cause diverse birth defects in humans (Feldman and Tibbetts 2015). Epidemiological studies suggest a relationship between environmental contaminant exposure and congenital anomalies in humans and wildlife, including urogenital defects (Lyons 2007, Winchester et al. 2009). However, it is unclear if current contaminant levels in Cook Inlet waters would substantially affect beluga fetal development (Burek-Huntington et al. 2022b).

Through routine surveillance in 2019, Cook Inlet beluga whales were found to have a marked increase in infections by the zoonotic bacterium Erysipelothrix (Rouse et al. 2025). This bacteria primarily affects swine, turkeys and sheep but is newly emerging in marine wildlife where it produces a range of symptoms including endocarditis (Forde 2025). Rouse et al. (2025) studied records and samples from 1998 and conducted interviews and a literature review. The authors found Erysipelothrix in 18 of 63 (28.6%) of Cook Inlet belugas necropsied between 2006 and 2023. When present after 2017, it was the primary cause of death in these whales but was rarely detected in wildlife, domestic animals, or the environment in and

around Cook Inlet. The authors hypothesize that this is likely an emerging phenomenon due to the lack of documented previous occurrence of Erysipelothrix in the area (Rouse et al. 2025).

Because cetaceans are vulnerable to respiratory disease, it is important to evaluate their respiratory health. As an option to the invasive collection of biopsy samples Richard et al. (2022) evaluated the collection of blow samples from beluga whales as a noninvasive tool to assess the expression of genes related to immune function in the respiratory tracts of beluga whales. The authors evaluated blow samples from aquarium belugas and wild belugas from the Bristol Bay population. The study results showed that RNA can be extracted from beluga blow samples, but the procedure was determined to be less efficient than skin biopsy sampling. Richard et al. (2022) conclude that further study is required to determine if quantitative gene expression data from blow samples can be directly associated with disease states in wild populations of beluga; the noninvasive nature of this approach may prove valuable for assessing disease states in populations such as the Cook Inlet belugas.

As described in **Section 5.1**, Wade et al. (2024) are compiling data from boat-based biopsy surveys of Cook Inlet beluga whales conducted from 2017 to 2019. While the compilation of biopsy results is not yet available, the field report (Wade et al. 2024) notes that 62 groups of beluga whales were encountered, with 47 groups approached for identification photographs. A total of 47 biopsy samples was collected from these whales: 12 in 2017; 21 in 2018; and 14 in 2019; with 27 of these from Chickaloon Bay, 19 from Knik Arm, and one from the Susitna Delta. The field report also includes 6 samples collected in 2016 (3 from the Susitna Delta). Therefore, 53 biopsy samples from photographed whales matched to the Cook Inlet Beluga Photo-Identification Catalog (McGuire et al. 2020) are available from the 2016 to 2019 surveys. Among other tests, analyses for POPs have been completed on these samples (G. Yitalo and I. Schulz, NWFSC, unpublished data), and the results will be compared to data from previous studies of Cook Inlet beluga whale contaminants (Becker et al. 2000, Becker et al. 2001, Burek-Huntington et al. 2022a, Hoguet et al. 2013). PAH contaminant analysis (from oil spills) has been completed on biopsy samples from 2016 to 2018 (G. Yitalo and I. Schulz, NWFSC, unpublished data), the first such data available for Cook Inlet belugas. Refer to **Appendix F** for a more detailed summary of the literature on effects of POPs, PAHs, and EPOCs on beluga whales and their prey.

Strandings: A mass stranding describes a simultaneous stranding of two or more cetaceans at the same time and space, other than cetacean cow/calf pairs (NMFS 2021a). Stranding events have been reported to occur more often in Turnagain Arm and Knik Arm than elsewhere in Cook Inlet. While Cook Inlet beluga whales have never been part of a declared unusual mortality event (UME),[49] they are frequently reported as "stranded."

A marine mammal is considered to be "stranded" if it meets one of these conditions (NMFS 2021a):

- Dead, whether found on the beach, ice, or floating in the water
- Alive on a beach (or ice) but unable to return to the water
- Alive on a beach (or ice) and in need of medical attention
- Alive in the water and unable to return to its natural habitat without assistance

Dushane (2013) summarized Cook Inlet beluga stranding events from 1987 to 2012. During the 25-year period, 207 beluga whales were recorded as dead stranded, with the highest annual dead stranding of 20 whales documented for 2003. On average annual dead stranding was variable, with an average of 8 whales

[49] https://www.fisheries.noaa.gov/species/beluga-whale/overview and https://www.fisheries.noaa.gov/insight/understanding-marine-mammal-unusual-mortality-events A UME is defined as defined as "a stranding that is unexpected; involves a significant die-off of any marine mammal population and demands immediate response Accessed February 9, 2024. Accessed February 9, 2024

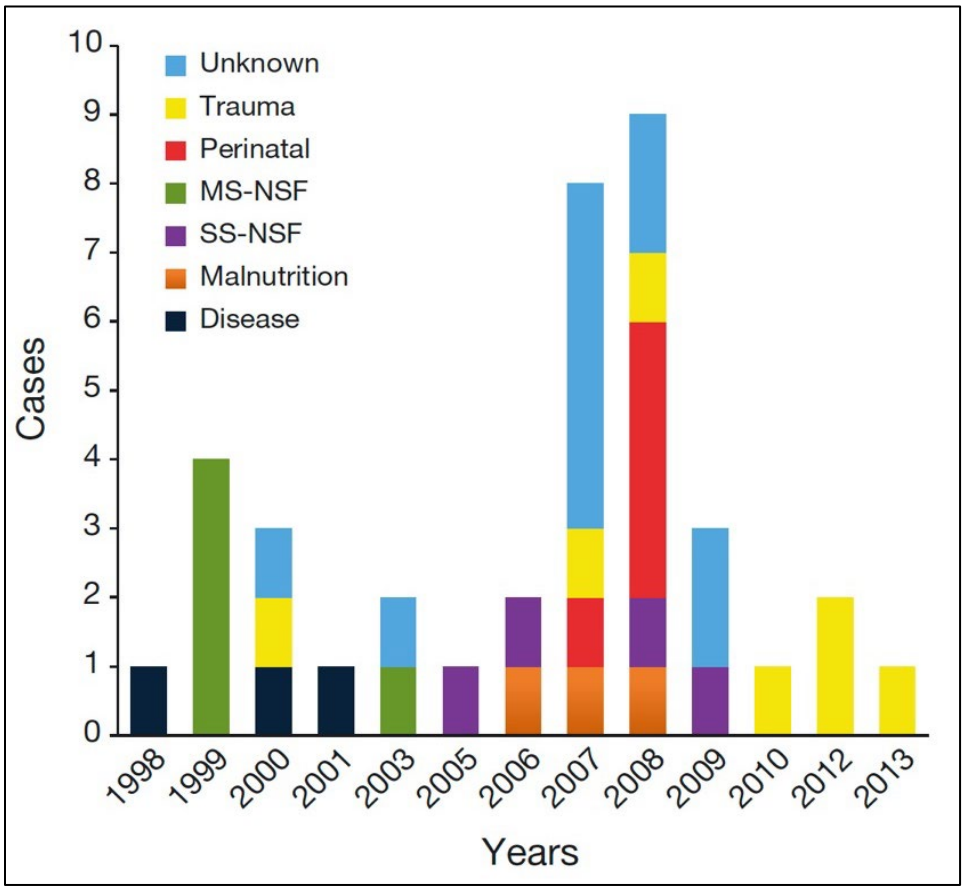
(standard deviation of 6). The majority of dead strandings occurred in August, followed by September, and July; the fewest whales were found dead in the winter and early spring months. During the same period, the number of live stranded beluga whales in Cook Inlet ranged from a high of 190 in 1994 to 2 in 2011 (Dushane 2013).

As reported by Burek-Huntington et al. (2015), between 1998 and 2013, 16 dead stranded beluga carcasses from Turnagain Arm, 11 from Knik Arm, and 11 from upper Cook Inlet were necropsied. Of the 38 examined whales, 7 were fresh or exhibited mild decomposition, 13 had moderate decomposition, 17 had advanced decomposition, and 1 was mummified. Because most specimens were decomposing, diagnostic options were limited. **Figure 5-6** shows necropsy cases by year and cause of death category as determined in this study.

As the population of Cook Inlet beluga whales has decreased, documented stranding numbers have also decreased. According to the most recent Alaska Marine Mammal Annual Stranding Report the most frequently stranded small cetaceans in Alaska in 2021 were beluga whales (18), of which 10 were from the endangered Cook Inlet beluga whale population (NMFS 2021a). The 10-year stranding average for this DPS (2011-2021) was calculated as 9 (SD 4).

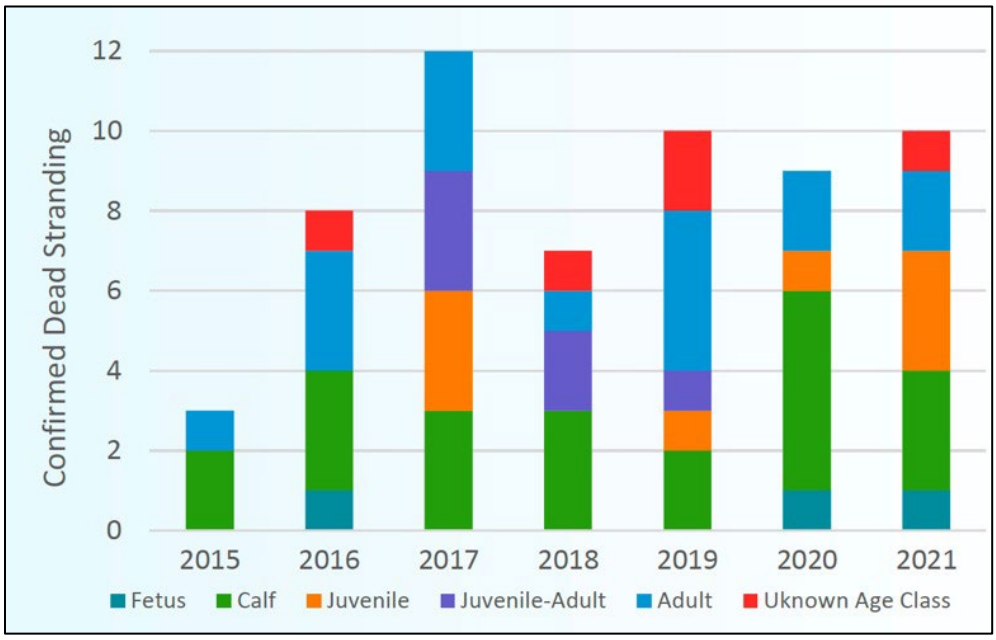
Between 2015 and 2021, there were 62 confirmed reports of dead stranded Cook Inlet beluga whales (**Figure 5-7**), with between 3 and 12 reports each year. Most of the stranded whales were in a state of moderate or advanced decomposition when first observed; therefore, the cause of death was not always determinable and not reported (NMFS 2021a, 2022a).

Figure 5-6. Cook Inlet Beluga Necropsy Results by Year and Cause of Death



Source: Burek-Huntington et al. (2015), Burek-Huntington et al. (2022a)
Note: MS-NSF = mass stranding, no significant findings; SS-NSF = single stranding, no significant findings

Figure 5-7. Confirmed Reports of Dead Stranded Cook Inlet Beluga Whales, 2015 to 2021



Source: NMFS (2021a, 2022a)

Rouse and Burek-Huntington (2023) were able to conduct a necropsy on a recently stranded Cook Inlet beluga whale found in Turnagain Arm in September of 2020. The subadult male had valvular endocarditis, encephalitis, rhabdomyolysis (damaged muscle fibers), nephropathy, and was severely affected by parasites and fungal dermatitis. *Erysipelothrix rhusiopathiae,* a bacterium known to cause disease in pigs, turkeys, and hens, was detected in the heart lesions and in eye and external swabs. The level of infection and parasitism in this individual whale was determined to be much higher than what has typically been found in other Cook Inlet belugas, suggesting that the animal may have suffered from immunosuppression.

Live strandings of beluga whales are regularly reported in Cook Inlet (NMFS 2022a). As shown in **Table 5-2**, six live stranding events of beluga whales were confirmed between 2015 and 2020, affecting 30 animals.

Table 5-2. Cook Inlet Beluga Documented Live Stranding Events 2015-2020

Date	Location	Description
August 27, 2015	Turnagain Arm, Bird Point	Cow/calf pair
September 30, 2017	Trading Bay, Tyonek	Calf
September 27, 2019	Kenai River, Rocky Point	6 unknown age class (not calf)
September 11, 2020	Turnagain Arm, Bird Point	Cow/calf pair
October 17, 2020	Turnagain Arm, Hope	2 unknown age class (not calf)
October 19, 2020	Knik Arm, Birchwood	17 unknown age class (not calf)

Source: NMFS (2022a)

Underwater Sound: Literature on underwater sound has appeared consistently in the years since the population has been listed under the ESA (Norman et al. 2022). As described in **Section 5.1.5**, considerable research characterizing ambient sound sources and levels in Cook Inlet has focused on commercial shipping and construction (for example, pile driving) as prominent sources of underwater sound (Castellote et al. 2024, Castellote et al. 2020a, Castellote et al. 2020b, Castellote et al. 2019, McHuron et al. 2023, Saxon Kendall and Cornick 2015). **Section 5.1.5** provides additional information on the hearing capacities of beluga whales and the potential threats of anthropogenic sound on the Cook Inlet beluga population.

Destruction of Habitat: **Section 5.1.6** describes the critical habitat designated for Cook Inlet beluga whales and potential threats to this habitat.

Prey Reduction: **Section 4.3** discusses the marine fish present in Cook Inlet that are available as prey for beluga whales. **Section 5.1.4** describes the prey of Cook Inlet beluga whales and discusses threats to their prey and feeding ecology.

Spills: BOEM (2021) assessed the potential effects of small and large oil spills on Cook Inlet beluga whales. The assessment determined that because small spills dissipate or are cleaned up rapidly, they would not be likely to affect cetacean populations and would have a limited ability to affect individual cetaceans. The effects of large spills (3,800 barrels [bls] or greater) on beluga whales in Cook Inlet would depend on the location, timing, duration, sea and climatic conditions, and response to a spill event. BOEM (2021) concluded that while there is minimal potential to affect large numbers of cetaceans because they are few in number at any given time in the inlet, the small population size of Cook Inlet belugas indicates that a small number of individuals could experience adverse effects leading to cascading effects on the population. The magnitude of population effects would vary based on the type of effect (mortality or injury versus disturbance) and the population size of the DPS at the time of the event.

When considering the potential for effects of spills on Cook Inlet belugas, it is important to look at the history of spills and the potential for large spill events to occur. Robertson et al. (2020) developed statistical methods to estimate oil spill occurrence based on past onshore and offshore spills in the Cook Inlet region. The authors compiled a dataset of 292 spills from available records covering the period 1966–2019. Spills were included if they were larger than one barrel and could be associated with Cook Inlet oil and gas exploration, development, or production infrastructure or activities. Only five spills greater than 1,000 bls have been identified in the history of the Cook Inlet oil fields. Most spills in the data set (213) were between 1 and 10 bls, totaling a volume of 765 bls (Robertson et al. 2020).

When the authors compared spills from 1996 to 2019 to oil production volumes, the total number of spills of all types correlated with production rates as both declined until 2018. However, in 2018 a sharp increase in production was observed without a correlating increase in spill rate (Robertson et al. 2020). Using a bootstrapping procedure and Monte Carlo simulation to estimate the spill volume, Robertson et al. (2020) estimated an annual oil spill volume of 87 bls (95% confidence interval of 6 to 226 bls) associated with an annual oil production level of 7.5 million bls in Cook Inlet.

Cumulative Effects: **Section 6.3** analyzes the potential cumulative effects and the effects of climate change on the Cook Inlet beluga whale DPS.

5.1.4 Beluga Whales – Prey and Foraging

Beluga whales feed on a wide range of fish and benthos (Quakenbush et al. 2015a), but their preferred prey are eulachon and Pacific salmon that spawn in rivers of upper Cook Inlet. Beluga whales do not break

apart or chew their prey; prey size is limited by what they can swallow whole (Nelson et al. 2018). Larger salmon are unavailable to smaller female belugas and their calves. Based on data from captive whales, SeaWorld reported that belugas consume approximately 2% to 3% of their body weight (approximately 18 to 27 kilograms) per day.[50]

Calkins (1989) documented 13 salmon tags in the stomach of an adult beluga whale found deceased in Turnagain Arm, and subsistence hunters in Cook Inlet observed 19 adult Chinook salmon in the stomach of one beluga whale (Huntington 2000). Observations suggest that fish such as Chinook salmon, chum salmon, coho salmon, and eulachon comprise the main diet of Cook Inlet belugas. These lipid-rich fish support the energy demands of the whales. As described in **Section 5.1**, seasonal movements of Cook Inlet beluga whales are strongly tied to the migration patterns of eulachon and Pacific salmon in the inlet (Moore et al. 2000). McHuron et al. (2023) used Stochastic Dynamic Programming to assess the effects of changes in prey availability on state-dependent life history of Cook Inlet belugas. Summer foraging activity was the highest of all seasons under all model scenarios based on the assumption that during that period, eulachon and salmonids are most abundant.

The diet of Cook Inlet beluga whales has mainly been determined from stomach content analyses of stranded or animals harvested for subsistence (Quakenbush et al. 2015a) and from the traditional knowledge of subsistence hunters (Huntington 2000). In the summer months, Cook Inlet belugas prey on seasonally available fish (eulachon, Chinook salmon) that enter Cook Inlet to spawn. Other fish prey available year-round in the inlet include saffron cod, walleye pollock (*Theragra chalcogramma*), Pacific cod, starry flounder, and yellowfin sole (*Limanda aspera*).

Cook Inlet belugas also ingest invertebrates, primarily shrimp from the families Caridea and Crangonidae, along with worms (Polychaeta), amphipods (Crustacea), and Oregoniidae crabs (Hobbs et al. 2008, Huntington 2000, Quakenbush et al. 2015a). Hobbs et al. (2008) note that some prey items found in beluga stomachs are likely from secondary ingestion of polychaetes, shrimp, amphipods, mysids, and other fish and invertebrates originally ingested by the Pacific cod.

In the fall, as seasonal salmon and eulachon runs begin to decline, belugas consume greater amounts of Pacific cod, Pacific staghorn sculpin, starry flounder, and yellowfin sole. Stomach samples from Cook Inlet belugas during the winter months are not available but data from belugas tagged with satellite transmitters suggest these whales feed in deeper waters of Cook Inlet during winter (Hobbs et al. 2005), where prey species such as flatfish, cod, sculpin, and pollock are likely available.

Diet changes are a concern in the lack of recovery of this population, but beluga feeding ecology is difficult to study (Nelson et al. 2018). While stomach content analyses of Cook Inlet belugas provide prey identifiable to species, the analyses are limited to whales that die shortly after eating and are immediately available for sampling (Nelson et al. 2018). Because of this limitation on sampling, there are insufficient beluga stomachs available throughout the year or annually to provide information as to whether their diet has changed over time (Nelson et al. 2018). Examining changes in prey availability over time is an alternative to directly studying the diet of Cook Inlet belugas through stomach content analyses (Nelson et al. 2018). As described in **Section 4.3**, prey assemblages in the Gulf of Alaska have oscillated between warm and cold regimes on multi-decadal scales. Based on the Stochastic Dynamic Programming method described in McHuron et al. (2023), reductions in prey availability in late spring to early fall showed an adverse effect on vital rates (survival rates, reproductive rates, and body condition) but intermittent disturbances that resulted in lost foraging opportunities had little impact on vital rates or body condition if

[50] https://seaworld.org/animals/all-about/beluga-whales/diet/; Accessed January 25, 2025.

prey were abundant in summer and early fall, suggesting that timing may be an important factor according to the model.

Isotopic analyses of teeth and bones from belugas can provide general information on their diet. Nelson et al. (2018) examined changes in Cook Inlet beluga whale feeding ecology and foraging location using nitrogen, carbon, and strontium isotope ratio from Cook Inlet beluga whale bones and teeth, and in water samples from Cook Inlet to determine if changes in whale feeding ecology had occurred during the last 50 years. Skulls from 20 Cook Inlet belugas and tooth growth layer groups (GLGs) from 26 individual Cook Inlet belugas showed decreasing trends for both nitrogen and carbon stable isotope ratios during the period 1962 to 2007 (Nelson et al. 2018). The decline in nitrogen isotopes (~1 to 2%) could indicate a trophic level shift but the magnitude of decline in carbon isotope values was more than 5 times greater than expected. This decline in carbon isotope values could be explained by a shifted baseline or by increased use of freshwater prey (Nelson et al. 2018). The authors also compared the strontium isotope composition of GLGs with rivers that flow into Cook Inlet. By considering nitrogen isotope values from the essential amino acid phenylalanine, they determined that declining carbon isotope values may be explained by two scenarios:

- Cook Inlet belugas foraged in the same location while the environmental isotopic baseline changed, or
- Cook Inlet belugas foraged in a different location with a different baseline.

Data analyzed by Nelson et al. (2018) provide evidence of a long-term shift to more freshwater-influenced feeding habitat and ecology in Cook Inlet beluga whales. This study presents the first evidence for a long-term (approximately 50-year) change in Cook Inlet beluga feeding ecology but how this behavior relates to the continued decline or possible recovery of the Cook Inlet beluga population remains unknown (Nelson et al. 2018).

Prey assemblages in the Gulf of Alaska have oscillated from warm (1947 to 1976) to cold (1977 to 1997) and back to warm regimes (1998 to present) on multi-decadal scales (Nelson et al. 2018). Cold regimes produce more high-quality forage fish for birds and marine mammals than warm regimes (Anderson and Piatt 1999). Little is known about how Cook Inlet prey assemblages are influenced by regime shifts in the Gulf of Alaska, but extensive closures of commercial shrimp, crab, and herring (*Clupea pallasii)* fisheries in lower Cook Inlet have occurred (Moore et al. 2000, Nelson et al. 2018). Changes in prey availability have the potential to affect Cook Inlet beluga survival rates.

Norman et al. (2020) assessed the relationship between per capita births of Cook Inlet belugas and summer salmon runs. As described in **Section 4.3**, Pacific salmon runs in upper Cook Inlet have been steadily declining. The authors developed an age-structured matrix model, to evaluate the sensitivity of population size and growth of Cook Inlet belugas, to variations in estimated Chinook and coho salmon abundance in the Deshka River, a major tributary of the Susitna River. Model simulations showed that if salmon runs remain at their current levels, the Cook Inlet beluga population is likely to continue to slowly decline and the per capita birth rate would remain low. The results from this study suggest reproductive success of Cook Inlet beluga whales is tied to Chinook salmon abundance in the Deshka River (Norman et al. 2020).

However, total salmon escapement numbers, as described in **Section 4.3**, may not be appropriate estimators of the number of salmon available as prey for Cook Inlet beluga whales because escapement in a particular river does not necessarily equate to fish available as beluga prey (Citta et al. 2016, Moore et al. 2000). Decreases in shrimp, crab, and some fish, including herring and salmon (Chinook, chum, and pink), have been documented in Cook Inlet during the last few decades but determining whether declines in prey

abundance directly correspond to declining Cook Inlet beluga foraging opportunities is difficult to measure (Moore et al. 2000, Shields and Dupuis 2013).

5.1.5 Beluga Whales – Acoustics

Beluga whales are in the mid-frequency hearing group with a generalized hearing range of 150 Hz to 160 kilohertz (kHz) (Southall et al. 2007). Anthropogenic sound has been identified as a major threat to the recovery of the endangered Cook Inlet beluga whale (NMFS 2022b, Norman et al. 2022). To describe ambient anthropogenic sound and evaluate the potential for acoustic effects on Cook Inlet beluga whales, Castellote et al. (2019) analyzed 8,756 hours of acoustic recordings collected from different locations in Cook Inlet during different time periods. Overall, ambient anthropogenic sounds have been reported as high and variable throughout Cook Inlet, with Castellote et al. (2019) reporting the loudest and most frequent anthropogenic sounds in the vicinity of the Port of Alaska and lower Knik Arm near the action area, an important passageway for belugas moving into Knik Arm to seasonally forage.

According to Castellote et al. (2019), anthropogenic sound sources characterized at most of the locations and time periods sampled for this study may chronically mask beluga communication and hearing capabilities. Ongoing activities associated with the Port of Alaska, such as shipping and dredging, exceed behavioral harassment levels in Cook Inlet beluga designated critical habitat (refer to **Section 5.1.6**). In addition, the authors identified high concentrations of sound sources near the action area in the lower reaches of Knik Arm and recommended that further research be conducted in that area to evaluate the potential for displacement of beluga whales from underwater sound (Castellote et al. 2019).

Expanding on the work of Castellote et al. (2019), Brewer et al. (2023) assessed the potential masking of beluga calls by underwater sounds from commercial ships in Cook Inlet. The authors classified beluga vocalizations into three categories: whistles (n = 1,264, 77%), pulsed calls (n = 354, 22%), and combined calls (n = 15, 1%) and documented 41 different beluga whale call types overall. The most common call types per category were then used to investigate masking by commercial ship sounds. Results of the study indicate that the most common beluga call types were partially masked by distant ship sounds and were completely masked by underwater sounds from nearby ships in the frequency range of 0 to 12 kHz (Brewer et al. 2023). In a subsequent study, Castellote et al. (2024) found that sound from commercial shipping was the main source of acoustic disturbance to Cook Inlet belugas in Tuxedni and Chinitna bays (located in western lower Cook Inlet) because of communication masking. This was despite low levels of temporal overlap with beluga presence.

Cook Inlet beluga whales typically inhabit shallow coastal waters and spend more than 78% of their time swimming at or near the water surface (< 1 meter depth) and approximately 22% of their time diving (Goetz et al. 2012, John et al. 2024). In a study addressing resting metabolic rates and active metabolic demands, John et al. (2024) determined that high speed escape responses to sound and other disturbance noticeably reduced the capacity for captive beluga whales to remain submerged for prolonged periods. By studying captive whales, the authors were able to measure resting and active beluga energetics under controlled conditions. They conclude that this causes the whales to remain aerobic for longer periods that then require prolonged recovery leading to levels of vulnerability to anthropogenic disturbance.

5.1.6 Beluga Whales – Critical Habitat

On April 11, 2011, NMFS designated two areas covering 7,800 km^2 of the Cook Inlet marine environment as critical habitat for beluga whales (**Figure 5-8**). Area 1 encompasses the area from the mouth of Three Mile Creek north and east to include waters of the Susitna, Little Susitna, and Chickaloon rivers below the

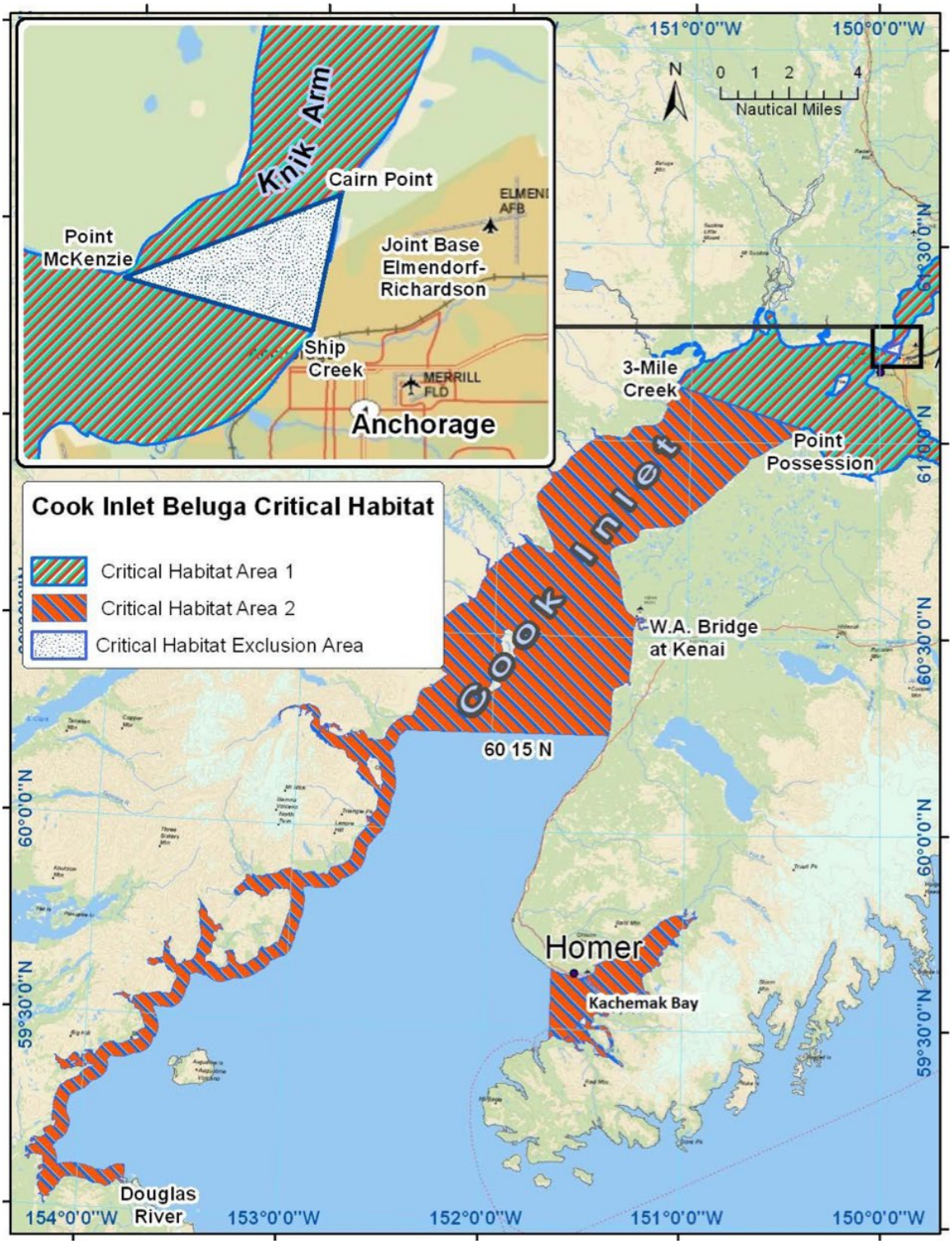
mean higher high water (MHHW) level. High concentrations of beluga whales are often observed in these areas from spring through fall. Drainages in Area 1 support large eulachon and salmon runs, providing important foraging habitat for Cook Inlet beluga whales during ice-free months; Area 1 is used extensively by these whales between April and November (NMFS 2008a). Critical Habitat Area 1 also encompasses shallow tidal flats or mudflats that provide belugas additional areas for foraging, calving, molting, and escape from predators. The action area near Point Woronzof lies within Critical Habitat Area 1.

Critical Habitat Area 2 lies south of Area 1 and encompasses all marine waters of Cook Inlet south of a line connecting Point Possession and the mouth of Three Mile Creek, and north of 60.25°N, including waters within 3.7 kilometers of MHHW along the western shoreline of Cook Inlet between 60.25°N and the mouth of Douglas River; all waters of Kachemak Bay east of 40.00°W; and waters of the Kenai River below the Warren Ames Bridge at Kenai. Area 2 includes nearshore areas along western Cook Inlet and Kachemak Bay; it is known as fall and winter foraging and transit habitat for beluga whales, as well as spring and summer habitat for smaller concentrations of belugas. There is also a beluga whale critical habitat Exclusion Area located in the Susitna Delta as shown by the triangular shape on **Figure 5-8**. This area is north of the AWPCF action area. The Susitna River Delta region is an area of high importance to Cook Inlet beluga whales, especially from mid-April to mid-October. During this period, large congregations of belugas may use this area for foraging and reproduction/calving. The Exclusion Area has specific activity restrictions that apply to vessels or other activities that may produce underwater noise, neither of which apply to the AWPCF NPDES permit application.

Specifically, critical habitat for Cook Inlet beluga whales is defined by PBFs (NMFS 2011), including:

- PBF #1: Intertidal Waters of Cook Inlet with depths less than 30 feet (9.1 meters) MLLW and within 5 miles (8 kilometers) of high and medium flow anadromous fish streams
- PBF #2: Primary prey species consisting of four species of Pacific salmon (Chinook, sockeye, chum, and coho), Pacific eulachon, Pacific cod, walleye pollock, saffron cod, and yellowfin sole
- PBF #3: Waters free of toxins or other agents of a type and amount harmful to Cook Inlet beluga whales
- PBF #4: Unrestricted passage within or between the critical habitat areas
- PBF #5: Waters with in-water sound levels resulting in the abandonment of critical habitat areas by Cook Inlet beluga whales

Figure 5-8. Cook Inlet Beluga Designated Critical Habitat



Source: https://media.fisheries.noaa.gov/dam-migration/belugawhale_cookinletch.pdf Accessed January 9, 2024.

As described in **Section 5.1.5**, activities associated with the Port of Alaska such as shipping and dredging, daily exceed behavioral harassment levels in a large portion of Cook Inlet beluga designated critical habitat (Castellote et al. 2019) and potentially affect PBF #5. Increased underwater sounds from ship traffic has been shown to potentially mask beluga whale calls (Brewer et al. 2023). The population appears to be consolidated into habitat in the upper-most reaches of Cook Inlet critical habitat for longer periods of time, where the environment is most likely to be noisy (Hobbs et al. 2015, Moore et al. 2000, Norman et al. 2015, Saxon Kendall and Cornick 2015).

Other potential existing threats to Cook Inlet beluga critical habitat PBFs are discussed in **Sections 4.2**, **4.4**, **5.1.3**, and **5.1.4,** including effects on beluga primary prey species (PBF #2) and ambient water quality in Cook Inlet that may relate to potential exposure of Cook Inlet beluga whales to contaminants (PBF #3).

5.2 ESA-Listed Species Infrequent in the Action Area

Western DPS Steller sea lions may be infrequently encountered in or near the action area of upper Cook Inlet. **Table 5-3** summarizes specific information regarding their abundance, presence in the area, Federal and state listing status, and citations for the information provided. Note that the Draft 2023 Alaska Marine Mammal Stock Assessment (Young et al. 2024) refer to Eastern and Western "stocks" of Steller sea lions but notes that these stocks are equivalent to the Eastern and Western DPSs identified under the ESA.

Steller sea lions exhibit significant sexual dimorphism; the average length of males is 2.8 meters and females average 2.4 meters in length (Loughlin 2009). Estimated average weight of males is 566 kilograms and females average approximately 263 kilograms. Pup weight at birth is 16 to 23 kilograms and may be slightly larger in the western part of their range. Pups are born with a wavy, chocolate brown fur that molts after 3 to 6 months. Adult fur color varies between a light buff to reddish brown with most of the under parts and flippers a dark brown to black; naked parts of the skin are black. Both sexes become blonder with age. Adult males have long, coarse hair on the chest, neck, and shoulders, which are massive and muscular (Loughlin 2009).

Table 5-3. ESA-Listed Species Infrequent in the Action Area

Species	Current Abundance	Federal Management Entity and Listing Status	State of Alaska Status	Frequency of Occurrence In or Near Action Area	Migratory Species?		Critical Habitat		Notes	References
					Y/N	Time Frame/ Duration In or Near Action Area?	Designated? (Y/N)	Located In or Near Action Area? (Y/N)		
Steller Sea Lion *Eumetopias jubatus* Western U.S. Stock[a]	54,267	NMFS Endangered	▪ Species of Conservation Need ▪ Culturally Important	Infrequent	N	Steller sea lions do not migrate but can move their central haulouts to track seasonal concentrations of their prey, which includes a wide variety of fish and cephalopods. They have been observed near the Port of Anchorage in May and June. There are no known haulouts in the vicinity of the action area.	Y	N	Critical habitat includes a 20-nautical mile buffer around all major haulouts and rookeries, none of which occur near the action area. Critical habitat does not extend into Cook Inlet waters.	ADF&G (2015) NMFS (2008c) Young et al. (2023) Muto et al. (2022) 62 FR 24345 58 FR45269

[a] As noted in the Draft 2023 SAR (Young et al. 2024) this stock is equivalent to the ESA-listed Western DPS.

5.2.1 Steller Sea Lion – Distribution, Local Movements, and Occurrence Near Point Woronzof

Steller sea lions occur throughout the North Pacific Ocean rim from Japan to southern California (Young et al. 2023). They are widely dispersed outside of the breeding season (late May to July) following prey availability. Steller sea lions tend to prefer isolated offshore rocks and islands to breed and rest. Rookeries and rest sites occur in many areas, principally on exposed rocky shorelines and wave-cut platforms, though the locations used are specific and change little from year to year (Loughlin 2009). Spatial needs vary between males, females, and juveniles, with additional differences also noted between breeding and nonbreeding individuals (Bishop et al. 2018). Bishop et al. (2018) determined that for Gulf of Alaska Steller sea lions, home ranges for males were larger (n = 104; 1080.1 km^2 ± 239.3) compared to females (n = 60; 455.66 km^2 ± 102.6) but the difference was not significant.

During monitoring for Anchorage port construction in upper Cook Inlet, Steller sea lions were observed near the Port of Alaska in May and June of 2020; four groups of four individuals were observed in May (61 North Environmental 2020d), and two groups of two individuals were observed in June (61 North Environmental 2020c). The port is approximately 6.5 kilometers to the northeast of the action area. An estimated 25 Steller sea lions were observed in the Lewis River, on the west side of Cook Inlet in 2022 at a location approximately 40 kilometers to the east of the action area (K. Lindberg, personal communication, August 13, 2022). No observations of Steller sea lions were recorded during a seismic program in eastern Cook Inlet near Trading Bay in 2012 (SAExploration 2012); Trading Bay is approximately 90 kilometers to the southwest of Point Woronzof.

Farther from the action area, in 2014, two individual sea lions were observed during seismic surveys in Cook Inlet but both sightings were below Kalgin Island, well south of the Forelands and the action area (Lomac-MacNair et al. 2014). During a 2018 pipeline replacement project in middle Cook Inlet, one group of two Steller sea lions was observed near Ladd Landing (Sitkiewicz et al. 2018) approximately 50 kilometers east of the action area, and during a lower Cook Inlet seismic survey (at a location approximately 250 kilometers or more south of the action area), five Steller sea lions were observed from project vessels and seven during aerial monitoring; all sightings were of solitary animals, one of which was a subadult female (Fairweather Science 2020).

5.2.2 Steller Sea Lion – Abundance and Trends

The most recent comprehensive aerial photographic and land-based surveys of Western DPS Steller sea lions in Alaska were conducted during the 2021 (Southeast Alaska and Gulf of Alaska east of Shumagin Islands) and 2022 (Aleutian Islands west of Shumagin Islands) breeding seasons (Sweeney et al. 2023, Young et al. 2024). Based on these surveys, the pup and nonpup model-predicted count estimates for Western Steller sea lions in Alaska in 2022 were 11,987 (95% credible interval of 11,291 to 12,7031) and 37,333 (34,274 to 40,245), respectively. PBR is 299 for the U.S. portion of the DPS (Young et al. 2024).

With respect to trends, Sweeney et al. (2023) conducted the most recent surveys of Steller sea lions in Alaska in June and July of 2023. The authors used a newly updated trend model to analyze all raw count data through 2022 to estimate counts as an index of abundance and annual rates of change. The analysis showed that nonpups and pups in the Western DPS increased between 2007 and 2002 at rates of 1.05 and 0.50% y^{-1}, respectively, but there was high variability among regions (Sweeney et al. 2023).

In the late 1970s, abundance of the Western stock of Steller sea lions was estimated to be 220,000 to 265,000 animals; however, by 2000, the population had decreased to less than 50,000 (Burkanov and Loughlin 2005, Loughlin and York 2001, Loughlin et al. 1984). Since 2003, abundance has increased but with considerable regional variation (Burkanov and Loughlin 2005, Fritz et al. 2019, Loughlin and York 2001, Loughlin et al. 1984, Sease and Gudmundson 2002).

Model results show pup and nonpup counts of Western DPS Steller sea lions in Alaska were at their lowest levels in 2002 and have increased at rates of 1.63% and 1.82% per year between 2002 and 2019 (Sweeney et al. 2019; as cited in (Young et al. 2023). Population abundance continues to exhibit strong regional differences across the species' range in Alaska, with positive trends observed in the Gulf of Alaska and eastern Aleutian Islands region, including the eastern Bering Sea, and generally negative trends observed in the central and western Aleutian Islands (Young et al. 2023).

5.2.3 Steller Sea Lion – Status and Risks

Based on demographic and genetic dissimilarities, NMFS identified two DPSs of Steller sea lions and listed them under the ESA: an endangered Western DPS and a threatened but now delisted Eastern DPS (62 FR 24345). Under the MMPA, the Western DPS is classified as a strategic stock, and therefore, is also designated as depleted (Young et al. 2023).

According to Young et al. (2023), risks to Steller sea lions occur from entanglement and entrapment in marine debris and fishing gear such as trawls, gillnets, and longlines; however, observer data are limited, and fisheries-caused mortality and serious injury may be greater than is reflected in existing observer data. Additional potential risks that could result in direct human-caused mortality or serious injury of this stock include disturbance at rookeries that could cause stampedes and illegal shooting (Young et al. 2023).

Freed et al. (2023) documented the mortality of nine Western Steller sea lions in Gulf of Alaska and Kodiak waters that occurred during commercial fisheries using seines, flatfish trawls, or sablefish longline gear. During the same period in the same areas plus Prince William Sound, 20 Western Steller sea lions were reported as seriously injured by entanglement in marine debris, and two additional animals suffered mortality (Freed et al. 2023). Injury or mortality from disturbance-caused stampedes is not documented but between 2013 and 2017, 59 animals with gunshot wounds were reported to the NMFS West Coast Region stranding network, resulting in a minimum mean annual mortality and serious injury rate of 12 Steller sea lions illegally shot from this stock plus 0.2 dependent pups seriously injured (Delean et al. 2020). Two additional Steller sea lions with gunshot wounds were reported to the NMFS Alaska Region stranding network between 2013 and 2017 (one each in 2016 and 2017) (Young et al. 2023).

5.2.4 Steller Sea Lion – Prey and Foraging

Steller sea lions forage on a variety of prey species depending on seasonal prey availability. They forage primarily at night for species of fish including Atka mackerel, walleye pollock, salmon, Pacific cod, Pacific sand lance, arrowtooth flounder, Irish lords, rock sole, capelin, eulachon, Pacific sandfish, Pacific herring, rockfish, smooth lumpsucker, and Pacific hake) and cephalopods (squid and octopus).[51]

[51] https://www.fisheries.noaa.gov/species/steller-sea-lion#:~:text=Steller%20sea%20lions%20are%20predatory,%2C%20eulachon%2C%20Pacific%20sandfish%2C%20Pacific; Accessed January 11, 2024.

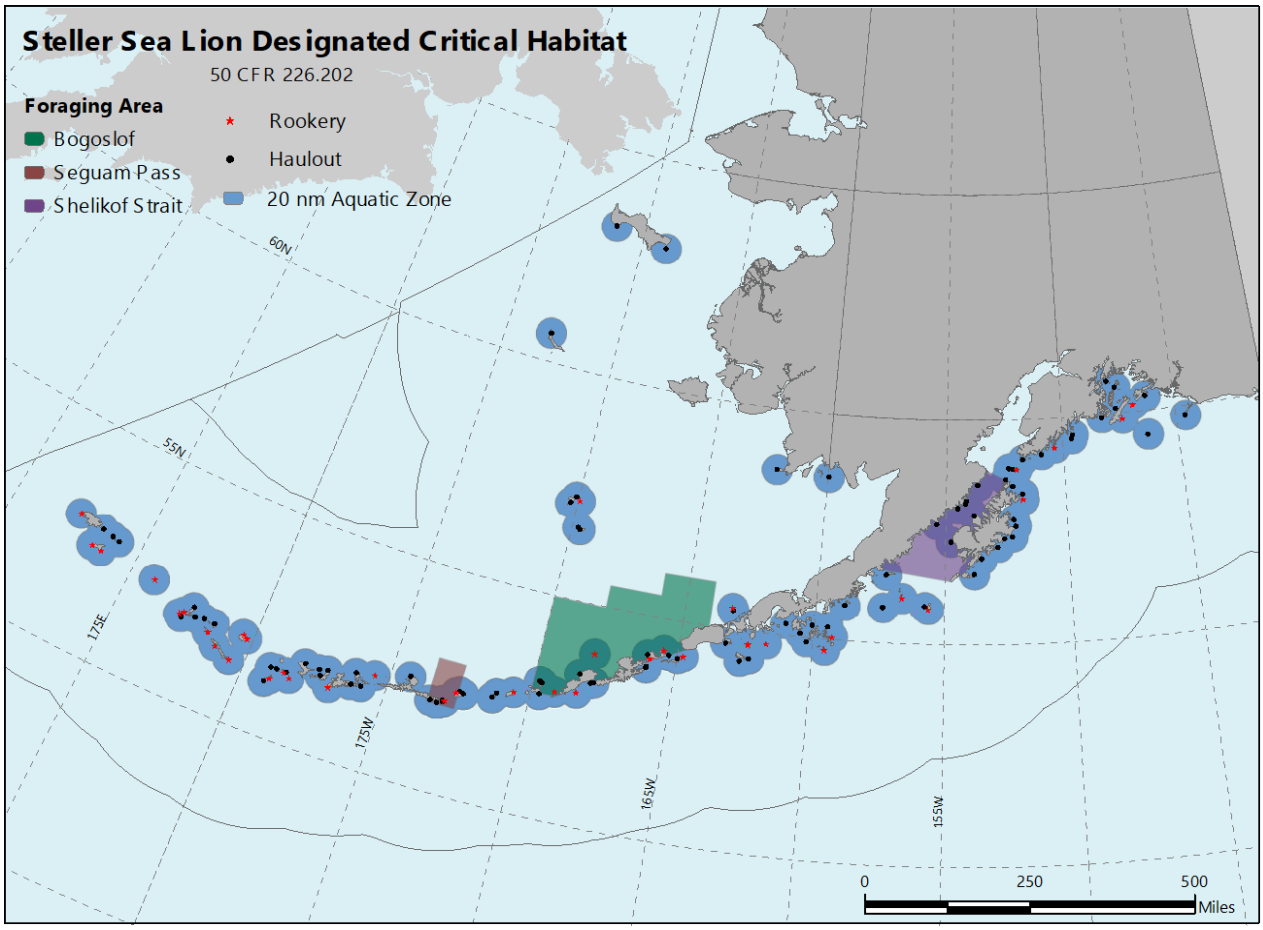
5.2.5 Steller Sea Lion - Acoustics

Steller sea lion hearing thresholds in air and underwater are similar to other otariids (Southall et al. 2007). For sounds in air, sea lion hearing ability ranges from 0.250 to 30 kHz, with the best hearing sensitivity from 5 to 14.1 kHz (Mulsow and Reichmuth 2010). Underwater, sea lion hearing ranges from 1 to 16 kHz. Higher hearing thresholds indicating poorer sensitivity were observed for signals less than 16 kHz and greater than 25 kHz (Kastelein et al. 2005).

5.2.6 Steller Sea Lion - Critical Habitat

Critical habitat for Steller sea lions was designated in 1993 (58 FR 45269) Critical habitat includes marine waters within 37 kilometers of rookeries and haulouts within the breeding range of the Western DPS and within three special aquatic foraging areas in Alaska (**Figure 5-9**). There is no designated critical habitat for Steller sea lions in Cook Inlet.

Figure 5-9. Steller Sea Lion Critical Habitat



Source: https://media.fisheries.noaa.gov/dam-migration/steller-sea-lion-critical-habitat-alaska.pdf; Accessed January 11, 2024

5.3 ESA-Listed Species Considered Rare in the Action Area

Three ESA-listed cetaceans and one invertebrate species that is a candidate for ESA-listing are considered to be rare in the action area. **Table 5-4** summarizes specific information regarding their overall abundance, potential presence in the action area, Federal and state listing status, and citations for information provided. There is no substantial presence of these species in the action area, and they are not expected to overlap with effluent from the AWPCF. Therefore, no effects are expected, and these species are not discussed further in this BE. Additional details regarding abundance and trends, status and risks, prey and foraging, and other details for each of these species can be found in **Appendix E**.

Table 5-4. ESA Listed or Candidate Species Considered Rare in the Action Area

Species	Current Abundance	Federal Management Entity and Listing Status	State of Alaska Status	Frequency of Occurrence In or Near Action Area	Migratory Species?		Critical Habitat		Notes	References
					Y/N	Time Frame/ Duration In or Near Action Area?	Designated? (Y/N)	Located In or Near Action Area? (Y/N)		
Humpback Whale *Megaptera novaeangliae* Mexico North Pacific Stock	918	NMFS Threatened	Species of Conservation Need	Rare	Y	May to October Whales from the Mexico North Pacific stock of the ESA-listed Mexico DPS and from the nonlisted Hawaii DPS migrate to Gulf of Alaska waters in the summer to feed and may be encountered in lower Cook Inlet. They have been observed near the mouth of Cook Inlet and near Anchor Point, approximately 180 kilometers south of the action area; several were observed near Tyonek, approximately 60 kilometers from the action area.	Y	N	In 2022, NMFS refined humpback whale stock structure based on feeding area and migratory routes and recognized 4 DPSs in the North Pacific: the Western North Pacific DPS (endangered); the Mexico DPS (threatened;) the Central America DPS (endangered); and the Hawaii DPS (not listed under the ESA). Critical habitat for the Mexico DPS includes the waters around Kodiak Island and the Barren Islands and extends northward to the mouth of Cook Inlet, where it is bounded by a line that extends from Cape Douglas across the inlet to Cape Adam. Critical habitat also includes the Prince William Sound area and associated waters. There is no designated critical habitat for humpback whales in Cook Inlet.	ADF&G (2015) Carretta et al. (2023) Young et al. (2023) 81 FR 62260 86 FR 21082 86 FR 41668 NMFS (2021d)
Gray Whale *Eschrichtius robustus* Western North Pacific (WNP) stock				Not Expected		WNP gray whales are primarily found along the coasts of eastern Asia. In 2020, gray whales were stranded in the Twentymile River of Turnagain Arm (more than 70 kilometers from the action area) and near Anchor Point (180 kilometers south of the action area). However, according to NMFS these whales were from the delisted Eastern North Pacific (ENP) stock.	N	N	Genetic studies have shown that there are there are two distinct populations of gray whales; the ENP stock and the endangered WNP stock. ENP gray whales were listed as endangered but successfully recovered and were delisted in 1994. WNP gray whales are now considered to be individuals that spend all or part of their lives in western North Pacific waters of Vietnam, China, Japan, Korea, or the Russian Far East. Only a small number of WNP whales (n=59) migrate to eastern North Pacific waters to feed in the winter. Therefore, it is likely that any gray whales observed in upper Cook Inlet and Turnagain Arm are from the delisted ENP stock.	Carretta et al. (2023) NMFS (2023d) https://www.fisheries.noaa.gov/feature-story/alaska-gray-whale-ume-update-twentymile-river-whale-likely-one-twelve-dead-gray-whales#:~:text=The%20gray%20whale%20that%20was,to%20the%20Gulf%20of%20Alaska https://www.fisheries.noaa.gov/national/marine-life-distress/2019-2023-eastern-north-pacific-gray-whale-ume-closed

Species	Current Abundance	Federal Management Entity and Listing Status	State of Alaska Status	Frequency of Occurrence In or Near Action Area	Migratory Species?		Critical Habitat		Notes	References
					Y/N	Time Frame/ Duration In or Near Action Area?	Designated? (Y/N)	Located In or Near Action Area? (Y/N)		
Fin Whale *Balaenoptera physalus* NE Pacific Stock	3,168	NMFS Endangered	Species of Conservation Need	Very Rare[52]	Y	Summer Fin whales in the eastern Pacific breed during winter in low latitudes. In summer, they migrate to feeding grounds in the Gulf of Alaska, near Kodiak Island and Prince William Sound. They are not expected to be encountered in upper Cook Inlet waters.	N	N	The 2019 5-year review concluded that the fin whale should be down-listed from endangered to threatened and recommended that NMFS commence rulemaking in the future to reclassify.	ADF&G (2015) Muto et al. (2021) Young et al. (2023) NMFS (2019c) 35 FR 18319 83 FR 4032
Sunflower Sea Star *Pycnopodia helianthoides*	N/A	NMFS Candidate Species; Proposed Threatened	None	Very Rare	N	Not migratory Sunflower sea stars are found in lower Cook Inlet and Kachemak Bay ranging to Anchor Point, approximately 180 kilometers south of the action area. They were not documented around Point Woronzof during the 2022, 2023, or 2024 field sampling effort for this project (Kinnetic Environmental Inc. 2023b, 2024c) This species is not expected to be encountered in the action area.	N	N	Public comments on the proposed rule and a final ruling on the listing of this species under the ESA were not available as of January 2024.	Lowry et al. (2022a) 86 FR 73230 88 FR 16212 88 FR 21600

[52] In November 2024, a fin whale washed ashore near Anchorage. NMFS scientists collected blubber samples; however, it was unclear if a necropsy was possible because of the deterioration of the carcass. This event is considered rare as fin whales are still considered uncommon in upper Cook Inlet News, A. D. (2024). Fin Whale Nearly 50 Feet Long Washes Ashore on Anchorage Tidal Flats: 2 pp..

6. Potential Effects of the Action

The evaluation of potential effects of the action focuses on Cook Inlet beluga whales and their designated critical habitat and the Western DPS of Steller sea lions. This evaluation was completed through the following:

- Evaluation of annual monitoring results, including comparison of contaminant concentrations detected in the AWPCF effluent stream against regulatory standards and results of WET testing.
- Estimation of potential for adverse effects to the Cook Inlet beluga whale and the Western DPS of Steller sea lions based on ingestion of prey fish.
- Estimation of potential for adverse effects to prey species of Cook Inlet beluga whales and the Western DPS of Steller sea lions based on direct contact and ingestion of residual contaminants in AWPCF effluent.
- Estimation of potential for adverse effects to Cook Inlet beluga whale critical habitat through application of the results of the nearfield and farfield hydrodynamic modeling in the risk estimates for both beluga whales and their prey species.

The evaluation of annual monitoring results and WET testing of contaminant concentrations in AWPCF effluent stream was presented in **Section 4** and **Appendix A** and is summarized in this section. The quantitative estimation of potential for adverse effects to the Cook Inlet beluga whale, the Western DPS of Steller sea lions, their prey species, and critical habitat are presented in **Appendix C** and are summarized in this section. In addition an extensive literature review of research and available data on the potential effects of certain pollutants on Cook Inlet beluga whales and their prey as well as other relevant marine species as additional context is included as **Appendix F**. The inclusion of broader scientific findings aims to illuminate the current understanding of each contaminant based on the best available science.

The following terms are used to describe the potential effects of the proposed action.

- *"Effects of the action are all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action."* 50 CFR § 402.02. As described in Section C.2.5 of Appendix C, the measures of effect used in the ecological risk evaluation and this BE are measurable changes in a receptor (that is, Cook Inlet beluga whale, Steller sea lion, or their prey) in terms of survival, community health, growth, or reproduction.
- *"Cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation."* 50 CFR § 402.02.
- *"Destruction or adverse modification means a direct or indirect alteration that appreciably diminishes the value of critical habitat as a whole for the conservation of a listed species."* 50 CFR § 402.02.
- *"No effect – the appropriate conclusion if an action will have no positive or negative effects to ESA-listed species or critical habitat"*.[53] A no effect determination generally means that the receptor

[53] https://www.fisheries.noaa.gov/insight/endangered-species-act-section-7-alaska-region; Accessed May 13, 2024.

(species) either would not be found within the action area or the proposed activities would not overlap with the species' distribution.

- "*Discountable*" is associated with a "Not Likely to Adversely Affect" finding, not a "No Effect" finding. As described previously, for something to truly be "No Effect," there must be no species or critical habitat overlap with the action area, presence in the action area but impacts are entirely temporally offset from species presence, or no plausible routes for an effect on the species. "Discountable" refers to effects that are possible but extremely unlikely to occur.
- "*May affect – the appropriate conclusion when a proposed action may pose any effects on listed species or designated critical habitat.*" ESA Consultation Handbook at page xvi.
- "*Is not likely to adversely affect – the appropriate conclusion when effects on listed species are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not: (1) be able to meaningfully measure, detect, or evaluate insignificant effects; or (2) expect discountable effects to occur.*" ESA Section 7 Consultation Handbook at pages xv to xvi.
- "*Is likely to adversely affect – the appropriate finding in a [BE] (or conclusion during informal consultation) if any adverse effect to listed species may occur as a…result of the proposed action…and the effect is not: discountable, insignificant, or beneficial (refer to definition of 'is not likely to adversely affect'). In the event the overall effect of the proposed action is beneficial to the listed species, but is also likely to cause some adverse effects, then the proposed action 'is likely to adversely affect' the listed species. If incidental take is anticipated to occur as a result of the proposed action, an 'is likely to adversely affect' determination should be made. An 'is likely to adversely affect' determination requires the initiation of formal Section 7 consultation.*" ESA Section 7 Consultation Handbook at page xv.

Final ESA effects determinations using these terms are provided in **Section 7**.

6.1 Evaluation of Monitoring Results and WET Testing

The evaluation of annual required monitoring results and supplemental monitoring results and WET testing of contaminant concentrations in the AWPCF effluent stream was presented in **Section 4** and **Appendix A.** The evaluation of potential risks from residual contaminants detected in effluent and fish tissue was presented in **Appendix C**. These evaluations are summarized along with additional interpretive discussion in this section.

6.1.1 Effluent Monitoring Results

6.1.1.1 General Water Chemistry

General water chemistry includes TSS, DO, BOD, temperature, TRC, ammonia, pH, and fecal coliform bacteria. Water quality standards and criteria for these constituents were presented in **Table 4-1** with the AWPCF sampling results from 2023. If unfavorable general water chemistry conditions are present, aquatic organisms may undergo stress, which could increase their susceptibility to contaminants.

Turbidity and Total Suspended Solids

Measurements of TSS and turbidity provide an assessment of suspended particles in water. TSS is related to turbidity; excess turbidity can reduce light in the water column that is available to phytoplankton and aquatic plants (NMFS 2023c). Reduced rates of photosynthesis cause less DO to be released into the water by plants. High TSS can increase surface water temperatures because suspended particles absorb heat from sunlight. Warmer water holds less oxygen than cold water. High TSS can also increase the concentration of bacteria, nutrients, pesticides, and metals in the water because pollutants may attach to sediment particles (NMFS 2023c). While a portion of these solids could accumulate on the sea floor, the tidal amplitude and currents in Cook Inlet, particularly in the action area, limit deposition (EPA 2013, NMFS 2019a).

The high tidal nature of Cook Inlet would make it unlikely that burial of benthic organisms in the action area would occur. The amount of suspended solids discharged from AWPCF is *de minimis* relative to the extremely large load of sediment discharged naturally into Cook Inlet from rivers and streams. Suspended solids from AWPCF discharged into Cook Inlet are unlikely to pose any risk to aquatic life because, as shown in **Table 4-1**, TSS concentrations in the effluent were well below current permit limitations of 170 mg/L monthly average and 190 mg/L daily average.

The outfall is in an area where fluctuations in temperature, turbidity, and salinity caused by the extreme tidal amplitude and currents occur daily. Such areas are typically low in productivity or favor productivity of small benthic invertebrates that are not major food items for fish species considered to be prey for beluga whales and Steller sea lions (NMFS 2020). Consequently, the action area is not a valuable source of invertebrates as prey for fish species (NMFS 2020). The discharge of suspended solids from the AWPCF into a natural background of high turbidity and suspended solids marine environment would not be expected to interfere with beluga whale or Steller sea lion foraging or attainability of prey. Belugas live in the naturally highly turbid waters of Cook Inlet and it is not expected that a small temporary and localized increase in suspended solids would impede their ability to transit or forage (NMFS 2020).

Dissolved Oxygen and Biochemical Oxygen Demand

DO must be present in the water column to support aquatic life (NMFS 2019a). DO is depleted when organic matter and ammonia are broken down by bacteria and converted to other compounds (EPA 2020a). This depletion of DO is measured as BOD. Specifically, BOD is a measure of the amount of oxygen consumed by bacteria and other microorganisms while they decompose organic matter under aerobic conditions at a specified temperature.[54] DO is depleted more rapidly as BOD levels increase (NMFS 2023c). Water with high BOD levels can cause increased bacterial concentrations that degrade water quality even more (EPA 2016a). High BOD loads in areas with low dispersion rates can reduce DO in the water column to the point that the survivability of marine organisms is threatened (NMFS 2019a). However, the impact of BOD on water quality is influenced by the dispersive capacities of the receiving water (EPA 2020a).

Cook Inlet and the area around the AWPCF outfall do not exhibit conditions where effluent BOD will affect DO because of the significant mixing that occurs (refer to Section 2.2.2). As shown in **Table 4-1**, maximum levels of BOD were well below permit limits and are additionally diluted in the mixing zone. Given the rapid currents and tidal amplitude in the vicinity of the APWCF outfall, waters in upper Cook Inlet would not become anaerobic because of APWCF effluent. Nearly 40 years of data collected from around the

[54] https://www.usgs.gov/special-topics/water-science-school/science/biochemical-oxygen-demand-bod-and-water Accessed May 24, 2024

outfall have shown DO levels to be at nearly 100% saturation. Therefore, ESA-listed species and their prey near the action area will not be affected by BOD levels within the ZID.

Temperature

Temperature is not a regulated condition of the current effluent discharge permit for AWPCF. As shown in **Table 4-1**, AWPCF effluent discharge temperatures in 2023 averaged 12.3°C and a high temperature at the AWPCF outfall of 14.0°C was reported (Jacobs 2023). Water temperatures in Cook Inlet vary considerably depending on location, depth, freshwater inputs, extent of ice formation, upwellings, and currents. As described in **Section 4.2.1,** based on the amplitude of the tide and significant currents in Cook Inlet, waters mix readily and seasonal variability in nearshore surface temperatures is common. Therefore, any difference between effluent and receiving water temperature (refer to **Table 4-1**) would be temporary and localized relative to the large water body (for example, Knik Arm is approximately 24 km^2 and Cook Inlet is approximately 20,000 km^2). Aquatic organisms are generally able to tolerate chemical toxicity under optimum environmental conditions (that is, conditions that represent their typical habitat) (Kazmi et al. 2022). For example, if temperature changes result in altering optimum habitat, it could result in species becoming more vulnerable to other stressors. However, water temperatures within the action area are within the normal range for Cook Inlet and would have no effect on ESA-listed species or their prey near the action area.

Total Residual Chlorine

As shown in **Table 4-1**, AWQS for TRC are met at the edge of the mixing zone in the action area. The AWPCF effluent TRC discharge is regulated under the existing NPDES permit effluent limit of 1.2 mg/L and is not a new or expanded effluent discharge constituent based on AWQS (18 AAC 70.015) and ADEC's Antidegradation Form 2G. An April 2025 Technical Memorandum (Jacobs 2025) prepared in support of the AWPCF NPDES 301(h)-modified permit specifically evaluated TRC based on field measurements in seawater near the AWPCF outfall and a laboratory study of TRC degradation rates in seawater collected from Cook Inlet. The analysis showed that TRC reductions from the AWPCF discharge plume dilutions in upper Cook Inlet document very rapid TRC reductions of 90% to 95% within 25 meters' distance from the AWPCF outfall in both dry and wet season conditions. TRC concentrations achieve the acute and chronic water quality criteria for TRC in the AWQS within or at the boundary of the 350-meter ZID (Jacobs 2025). In addition, based on the highest daily effluent TRC concentration (808 µg/L) and a 180:1 dilution credit, the maximum TRC at the ZID boundary was estimated to be 4.5 µg/L, meeting all AWQS (Kinnetic Environmental Inc. 2024a).

The mechanism of toxic action of chlorine occurs prior to exposure via ingestion, thus making bioaccumulation risks unlikely (Shepard et al. 2015). While chlorine ions and residuals can exhibit high toxicities at low concentrations in marine waters, they tend to decompose quickly (NMFS 2019a). Chlorine decomposition and dilution occur rapidly within the action area (Jacobs 2025).

Fish may avoid chlorinated waters under some circumstances, but the extent to which they may do so in the wild is unknown (Larson et al. 1978). Gills serve vital functions to fish, including gas exchange, ionic regulation, acid-base balance; research has indicated there are several compounds, metals, other constituents that may affect gill structure and function (Evans 1987). Thus, Cairns Jr et al. (1975) suggested that chlorine toxicity may occur through the gills depending on concentration, water temperature, species, and several other factors related to exposure. Chlorine exposure to fish may result in reduced respiration, damage to fish eggs and reduced hatching success, and delay of larval development (NMFS 2019a). Research reported in Liu et al. (2023) reported a tolerance limit of 0.3 mg/L of residual chlorine to fish. As reported in Liu et al. (2023), when effective chlorine in effluent discharged to seawater

was 0.2 to 0.5 mg/L (200 to 500 μg/L), phytoplankton exhibited strong recovery potential as indicated by cell (diatom) density at 3, 6, and 8 days post elevated concentration exposure.

Temporary, localized increases in TRC are unlikely to have measurable effects on ESA species or their prey; the mixing zone is not preferred habitat for these species, so they are unlikely to remain in the mixing zone long enough to risk exposure.

Ammonia

As shown in **Table 4-1** and discussed in **Section 4.2.1**, the monthly maximum ammonia in AWPCF effluent in 2023 was 33 mg/L (Kinnetic Environmental Inc. 2024a), which is well below the regulatory limit. Mixing occurs rapidly within the ZID because of the large tidal amplitude and strong currents in the action area, and the volume of effluent discharged is comparatively low. Ammonia is expected to be diluted below effect concentrations nearly instantaneously in the receiving waters. Neither the ESA-listed species nor their prey spends a significant amount of time in the immediate vicinity of the outfall and any exposure to ammonia is not considered to be ecologically meaningful.

In the aquatic environment, ammonia is one of several forms of nitrogen and is considered to be a key component of the nitrogen cycle (NMFS 2019a). In aqueous solutions, total ammonia consists of two primary forms: ionized and unionized. While unionized ammonia is the most toxic form to aquatic life, it is continually recycled in the environment and does not bioaccumulate in the same way that certain metals do (NMFS 2019a). If ammonia concentrations in the water column are high, it can accumulate in the blood and tissues of mammals and fish because organisms are unable to sufficiently excrete it (NMFS 2023c). An accumulation of ammonia in fish tissues can result in respiratory distress leading to death (Willingham 1976). Ammonia is very soluble in water; therefore, environmental factors such as pH and temperature can affect ammonia toxicity to aquatic species (EPA 2013). Aquatic invertebrates are most susceptible to ammonia toxicity, although tolerance to ammonia varies depending on species, physiology, exposure, and other factors (Zhang et al. 2023). Research has demonstrated that invertebrates employ various strategies for excreting excess ammonia and others appear to maintain hemolymph ammonia at high levels, suggesting ammonia is involved in some physiological processes (Weihrauch and Allen 2018).

Fish are adept at sensing and avoiding very low concentrations of ammonia and have been reported to enter waters that contain acutely toxic concentrations of ammonia without suffering any obvious long-term effects if they move quickly to waters below acute toxicity levels (Thurston et al. 1981). Under normal conditions, ammonia is extremely water soluble and fish can easily excrete excess amounts across the gills (Ip and Chew 2010). Effects of ammonia on ESA-listed species or their prey are not expected in or near the action area.

pH

The pH scale measures whether a substance or solution is acidic or basic; a pH of 7 is neutral, pH less than 7 is acidic, and pH greater than 7 is basic.[55] Normal pH of seawater ranges from 7.5 to 8.5 and is relatively stable because of the buffering capacity of strong basic cations such as sodium, potassium, and calcium (Canadian Council of Ministers of the Environment 1999). In waterbodies such as Cook Inlet, considerable dilution of seawater occurs because of freshwater input, thus buffering pH to sufficiently maintain stable slightly alkaline values (Canadian Council of Ministers of the Environment 1999).

[55] https://www.epa.gov/goldkingmine/what-ph Accessed May 29, 2023

Although not the case based on measured levels of pH in the AWPCF action area, fluctuations in pH can result in organism stress, changes in physiological processes, and increased bioavailability or toxicity of some contaminants (Heugens et al. 2001). While marine and estuarine organisms have been shown to experience decreases in carapace weights (invertebrates), which correlated to a decrease in pH (Canadian Council of Ministers of the Environment 1999), pH values measured in the action area are relatively stable and not likely to affect marine biota. In 2023, the pH of AWPCF effluent was within the natural range of Cook Inlet (between 6.0 and 8.5) and did not differ more than 0.2 from that natural range in accordance with the regulations (refer to **Table 4-1**). These pH levels do not adversely affect marine mammals or their prey species in upper Cook Inlet.

Fecal Coliform and Other Bacteria

As described in **Section 4.2.1**, AWPCF has been effective at removing fecal coliform bacteria likely because of improvements in chlorine disinfection of the effluent (Kinnetic Environmental Inc. 2024a). At levels recorded in the most recent annual sampling effort (refer to **Table 4-1**), levels of bacteria in AWPCF effluent are not expected to affect marine life in Cook Inlet.

Fecal coliform bacteria are found in the feces of warm-blooded animals and may affect the water quality and other resources in coastal environments (Wolf et al. 2007). Sources of fecal microbes entering nearshore aquatic environments within Cook Inlet include wild and domestic animal-derived fecal matter carried in stormwater runoff, runoff from snowmelt and surface waters, and effluent from WWTF outfalls such as AWPCF (Norman et al. 2013).

A 2011 Cook Inlet study reported results for fecal coliform bacteria from water samples from eight sites, including AWPCF effluent (Norman et al. 2013). The study reported that fecal coliform counts did not exceed AWQS limits for marine recreational waters (200 FC/ml). Fecal loading from human-specific markers in water and sediment samples from Cook Inlet were the type most frequently detected, followed by bovine sources (Norman et al. 2013). Canine-associated markers were also prevalent in water samples while avian-associated markers were detected in sediment samples. *Giardia* and *Vibrio* spp. were the most common species of other bacterial organisms sampled in the study as reported by Norman et al. (2013)

While reports of other beluga and marine mammal populations may demonstrate that fecal pathogens and bacteria such as *Vibrio* spp. could pose a threat to the health and viability of these species (Higgins 2000), morbidity and mortality from fecal pollution have not yet been conclusively demonstrated in Cook Inlet beluga whales (Norman et al. 2013). Exposures of beluga whales, Steller sea lions, and their prey to terrestrial-source fecal pathogens from AWPCF effluent discharge is likely to be relatively infrequent and likely at low levels because of dilution of the effluent in the inlet from large tidal currents (Norman et al. 2013) so as not to pose risk to these species.

6.1.1.2 Chemical Monitoring Results

Evaluation of chemical results from annual monitoring requirements compared to NPDES permit levels was presented in **Section 4**. Potential for risk from all chemicals detected in effluent to ESA-listed species and their prey was evaluated along with the results of all supplemental sampling as part of the ecological evaluation (**Section 6.2**, **Appendix C**).

Metals and Cyanide

EPA publishes and maintains NRWQC for metals and other parameters.[56] These concentrations are considered protective of aquatic life. In addition to the NRWQC for metals described in **Section 4.2.2**, the State of Alaska has promulgated SSWQC for 10 metals and total cyanide in Cook Inlet waters near Point Woronzof[57] (ADEC 2022c). These SSWQC are shown in **Table 4-3** and were used in the risk evaluation when they were more conservative than the NRWQC.

An assessment of wastewater discharge indicated that metal and total cyanide concentrations in the effluent pose no overall threat to Cook Inlet beluga whales, Western DPS of Steller sea lions, or their food sources. The refinement HQs for all receptors were below 1 for all exposure areas (refer to **Section 6.2**). Modeling predicts that these metals will quickly dilute to levels that do not pose a threat to these ESA species or their prey within a short distance from the AWPCF outfall. Considering the limited time these species spend at the outfall, exposure risk is unlikely. Consequently, sustained exposure to harmful concentrations within this limited zone is improbable for Cook Inlet belugas, Steller sea lions, or their prey species.

Migratory fish passage is crucial within Cook Inlet beluga critical habitat, particularly for salmon and eulachon returning to freshwater. Research indicates that zinc concentrations can deter various trout species at low levels (NMFS 2019a). Based on laboratory testing published in (Chapman 1978), the 96-h LC50 values for all four life stages of Chinook salmon ranged from 1 to >27 µg/L for cadmium, 17 to 38 µg/L for copper, and 93 to 815 µg/L for zinc. Steelhead showed greater sensitivity to these metals than Chinook salmon. Juvenile rainbow trout avoidance has been documented at zinc concentrations as low as 5.6 µg/L and 47 µg/l at a hardness of 13 mg/L. Avoidance in juvenile brown trout and juvenile cutthroat trout was documented at 25 µg/L and 28 µg/L, respectively (Woodward et al. 1997, Woodward et al. 1995). Consequently, NMFS has established conservative passage thresholds for metals, including zinc, based on these studies (**Table 6-1**). Water sampling near the AWPCF outfall in Cook Inlet generally shows metal concentrations significantly lower than these thresholds, with copper being an exception in some years (refer to **Table 4-3**). Dissolved copper in AWPCF effluent is estimated to be well below the passage threshold (**Table 6-1**) prior to the edge of the ZID.

Table 6-1. Summary of Estimated Fish Passage Threshold Concentrations (µg/L Dissolved Metal) for Certain Metals Present in Discharges into Authorized Mixing Zones Based on the Available Data

Passage Threshold[a]	Cadmium	Chromium	Copper	Mercury	Zinc
Laboratory	8	10	3[b]	0.2	6
Field	16	20	3[b]	0.4	12

Source: NMFS (2019a).

[a] Estimates of fish passage thresholds were identified based on the available data discussed in Section 6.3.2.1. Laboratory thresholds from the literature review were multiplied by 2, the lowest laboratory-to-field ratio reported for the literature reviewed (Hartwell et al. 1987), to obtain estimates of field avoidance thresholds, except for copper. The estimated threshold for copper is instead identified as 3 µg/L because of the ambiguity in the available data. The estimated threshold for mercury is based on attraction rather than avoidance, which could also affect passage.

[b] Applicable only to fresh water; increasing dissolved organic level is expected to increase this threshold.

[58] https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#:~:text=The%20CCC%20of%2020mg/L,mg/L%20whichever%20is%20higher Accessed March 9, 2025

[58] https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#:~:text=The%20CCC%20of%2020mg/L,mg/L%20whichever%20is%20higher Accessed March 9, 2025

Total Aromatic Hydrocarbons (TAqHs)

The State of Alaska has promulgated marine water quality standards for the growth and propagation of fish, shellfish, other aquatic life, and wildlife. TAHs and TAqHs are regulated as petroleum hydrocarbons, oil, and grease (ADEC 2022c). TAHs must not exceed 10 µg/L and TAqHs must not exceed 15 µg/L. There are no NRWQC for oil and grease or any TAHs.[58] Potential risk from petroleum mixtures is evaluated through the primary compounds, including PAHs and BTEX.

Semi-Volatile Organic Compounds (SVOCs) and Polycyclic Aromatic Hydrocarbons (PAHs)

Selected SVOCs/PAHs have established drinking water criteria (ADEC 2022b); however, aquatic and marine AWQS are not currently available. In addition, as described in **Section 4.2.3,** there are no NRWQC for SVOCs/PAHs.[59]

The risk evaluation (**Section 6.2** and **Appendix C**) examined the potential impact of organic compounds found in WWTF discharge on Cook Inlet beluga whales, Western DPS of Steller sea lions, and their prey fish. The evaluation concluded that the detected concentrations of these compounds are not expected to negatively affect any of these species.

Concentrations of SVOCs/PAHs in effluent are diluted to below effect levels seconds after discharge even under "critical conditions" of the peak discharge rate, slack tide, and lower than typical Cook Inlet currents, which represent the lowest expected dilution rate in the AWPCF action area. For these reasons, exposure to the effluent does not pose a threat to Cook Inlet beluga whales, Western DPS of Steller sea lions, or their prey. Potential consumption of prey species that have bioaccumulated contaminants may result in adverse effects to Steller sea lions under the most conservative exposure and toxicity assumptions. However, Steller sea lions are not reported to spend sufficient time in the action area at Point Woronzof to result in exposure durations that could result in potential adverse effects (refer to Appendix C).

TPAH concentrations ranged from 0.007 to 0.091 µg/L at the AWPCF sampling control stations and from 0.034 to a maximum of 0.771 µg/L at the outfall stations. The TPAH concentration measured in the AWPCF effluent sample was 4.884 µg/L (refer to **Section 4.2.3**).

Persistent Organochlorine Pollutants (POPs)

The State of Alaska (ADEC 2022b) has promulgated acute and chronic marine AWQS for toxics and other deleterious substances, including PCBs and several pesticides. These standards for aquatic life mirror the NRWQC.[60]

In May 2001, 90 nations joined forces to create the historic Stockholm Convention to address the problem of POPs in the environment. The Stockholm Convention is a legally binding international instrument, designed to lead to gradual decrease of the presence of POPs in the environment.[61] The U.S. signed the Convention in 2001 but has not ratified because the U.S. lacks the authority to implement all of its

[58] https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#:~:text=The%20CCC%20of%2020mg/L,mg/L%20whichever%20is%20higher Accessed March 9, 2025
[59] https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table#:~:text=The%20CCC%20of%2020mg/L,mg/L%20whichever%20is%20higher Accessed March 9, 2025
[60] https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table Accessed September 23, 2024
[61] https://www.pops.int/Home/tabid/2121/Default.aspx Accessed September 5, 2024

provisions.[62] Twelve main POPs, often referred to as the Dirty Dozen, are subject to reduction or eradication under this treaty (Fitzgerald and Wikoff 2014). The 12 POPs are PCDDs, PCBs, PCDF, toxaphene, aldrin, endrin, DDT, chlordane, dieldrin, mirex, heptachlor, and HCB. Sixteen additional POPs were added in 2023.[63] Additional POPs continue to be added through amendments.[63]

Overall, POPs detected in AWPCF effluent are not likely to affect Cook Inlet beluga whales, Steller sea lions, or their prey species (refer to **Section 6.2** and **Appendix C**). Sufficient mixing occurs rapidly within a short distance of the outfall; therefore, effects of POP exposure to prey species are not likely. In addition, refined HQs for all POPs were less than 1 for prey species. Refined HQs for individual POPs as well as the cumulative sum of refined HQs for organochlorine pesticides were less than 1 for Cook Inlet beluga whales and Steller sea lions.

Cook Inlet belugas and the Western DPS of Steller sea lions do not forage adjacent to or remain near the outfall 100% of the time (refer to **Section 5.1.4** which describe foraging behaviors). In addition, since 2011, EPA has implemented and revised regulations to place restrictions on the use and production of PDBE.[64] These factors indicate that potential effects on species from exposure to PDBEs are not likely.

Fluorinated Surfactants and Flame Retardants

In 2015, EPA proposed a SNUR for long-chain PFAS, requiring manufacturers and importers to notify the agency at least 90 days before starting or resuming manufacture, import, or processing of any products using these chemicals (EPA 2020b). In February 2020, EPA further strengthened regulations on imported products containing these chemicals in surface coatings (EPA 2020b).

In an April 2022 memorandum, EPA announced that the NPDES program would be used to restrict PFAS discharges (EPA 2022), including requirements to monitor for PFAS in all federally issued discharge permits, use best management practices such as product substitution and good housekeeping practices, and to address PFAS-containing firefighting foams in stormwater (EPA 2022). Also in April 2022, EPA published draft nationally recommended freshwater aquatic life criteria for PFOA and PFOS (EPA 2022). In September 2024, EPA published a marine acute BM of 550 µg/L for PFOS and a marine acute BM for PFIA of 7,000 µg/L (EPA 2024b, c). BMs are not regulatory values but instead used for informational purposes.

Regulatory criteria and accepted toxicity data for PFAS compounds are rapidly changing. Based on the most recent toxicity data available to evaluate PFAS in AWPCF discharge, the risk evaluation determined that risks of contamination to Cook Inlet beluga whales, the Western DPS of Steller sea lions, and their prey are not likely (refer to **Appendix C**). As described in **Section 4.2.4**, AWPCF samples collected at the outfall in 2024 contained 10.4 ng/L of total PFAS. This concentration would be further diluted within the proposed 350-meter mixing zone because of the tidal amplitude and currents encountered in the action area. Samples collected in 2024 at a location 1,400 meters from the outfall measured 0.589 ng/L of total PFAS (Kinnetic Environmental Inc. 2024b).

As described in **Section 2.4** and the *2024 Outfall Mixing Zone Study* (Jacobs 2024), effluent dilution occurs rapidly after discharge; therefore, any measurable levels of PFAS would be below the most sensitive no effect levels within 1 meter of the AWPCF outfall. For this reason, and because beluga whales, Steller

[62] https://www.state.gov/key-topics-office-of-environmental-quality-and-transboundary-issues/stockholm-convention-on-persistent-organic-pollutants/; Accessed March 30, 2025
[63] https://www.pops.int/TheConvention/ThePOPs/TheNewPOPs/tabid/2511/Default.aspx Accessed September 5, 2024
[64] https://www.perplexity.ai/search/epa-regulations-since-2011-req-8m86n8TuTLiuAY21uV38PQ; Accessed March 30, 2025

sea lions, and their prey do not spend 100% of their time exposed to undiluted effluent, there is no risk of PFAS exposure to Cook Inlet belugas or Western DPS of Steller sea lions through food chain uptake. Although there are uncertainties with these compounds related to the lack of marine water quality criteria or reliable oral toxicity data for detected PFHpA, PFPeA, and PFPeS for ESA-listed (or any other) species, the analysis of AWPCF effluent, considered with the rapid dilution of the effluent, indicate there is no estimated risk from other PFAS, and the likelihood of toxicity from these compounds is considered discountable because exposure is extremely unlikely to occur as a result of AWPCF effluent.

Nonylphenols and Nonylphenol Ethoxylates

As described in **Section 4.2.4**, in 2014, EPA proposed a SNUR, which would require manufacturers to provide at least 90 days' notice to EPA before commencing or resuming any significant new use of 15 NPs/NPEs that are no longer used in commerce; as of July 2024, it has not been finalized. EPA has not issued NRWQC for NPs/NPEs[65]. For nonylphenol, the *State of Alaska Water Quality Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (ADEC 2022b) states marine acute and chronic AWQS are 7.0 µg/L and 1.7 µg/L, respectively.

AWPCF is not required to monitor NPs/NPEs in effluent or receiving waters (refer to **Section 4.2.4**). However, as part of this permit renewal evaluation, effluent and receiving water samples collected in 2024 were analyzed for these compounds (refer to results in **Table 4-7**). While three of the four compounds were detected in both the effluent and the receiving water at the outfall, no NP/NPE compounds were detected at the ZID boundary, nearfield location (1,400 meters from the outfall), or at the control sites near Point MacKenzie.

Concentrations of NPs/NPEs detected in AWPCF effluent were not high enough to result in HQs exceeding 1 for Cook Inlet beluga whales, Western DPS of Steller sea lions, or their prey species in any evaluated scenario. Therefore, effects of NPs/NPEs from AWPCF discharge are considered discountable because there are no plausible routes for an effect on these ESA-listed species.

6-PPD Quinone

Data on chronic 6-PPD quinone toxicity and the compound's overall toxicity in estuarine/marine waters are extremely limited (EPA 2024a) and there are no NRWQC for 6-PPD quinone in marine waters. As described in **Section 4.2.4,** research indicates that coho salmon are very sensitive to 6-PPD quinone.

AWPCF undiluted effluent samples collected in 2023 contained 0.016 µg/L of 6-PPD quinone (Kinnetic Environmental Inc. 2024d) and an undiluted effluent sample collected in 2024 contained 0.0053 µg/L of 6-PPD quinone (refer to **Table 4-7**) (Kinnetic Environmental Inc. 2024b). Tier 1 risk screening presented in Appendix C did not identify risk to Cook Inlet beluga whales, Western DPS of Steller sea lions, or their prey from this compound at the end of the pipe. In addition, these concentrations would be further diluted within the proposed 350-meter mixing zone from the tidal amplitude and currents encountered in the action area.

As described in **Section 4.2.4**, a median lethal concentration of approximately 0.8 µg/L (Tian et al. 2021) has been indicated for juvenile coho salmon. AWPCF undiluted effluent samples are well below the 0.11 µg/L screening value proposed to protect freshwater aquatic life (EPA 2024a). 6-PPD quinone was included in the risk evaluation (Appendix C). Considering the maximum detected concentration in the

[65] https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table Accessed July 25, 2024

effluent and the rapid dilution that occurs immediately upon discharge at the end of pipe, there is no estimated risk of effects to prey species, Cook Inlet beluga whales, or Western DPS Steller sea lions given the measured concentrations. Therefore, no potential effects from 6-PPD quinone that may occur in low concentrations in AWPCF effluent discharge will result in adverse effects on Cook Inlet belugas, Western DPS of Steller sea lions, or their prey.

Pharmaceuticals and Personal Care Products

There are no specific State of Alaska or federal regulations for PPCPs (refer to **Section 4.2.4**). However, the EPA has established a point source category for pharmaceutical manufacturing. Eight priority pollutants and 16 nonconventional pollutants are listed in this point source category (AWWU 2011). As of 2011, the EPA identified 304 facilities throughout the U.S. that use solvents and discharge wastewater from pharmaceutical manufacturing processes, although none of these facilities is located in Alaska (AWWU 2011).

Concentrations of PPCPs in AWPCF effluent were evaluated for potential effects of PPCPs on Cook Inlet beluga whales, Western DPS of Steller sea lions, and their prey species in the risk evaluation (**Appendix C**). Screening and refined HQs were below 1 for both prey species and ESA-listed species.

While there are some uncertainties in evaluating potential toxicity of PPCPs because not all of the oral toxicity data available are applicable for this evaluation (refer to **Appendix C**), considering that high levels of dilution occur within the ZID, and that Cook Inlet belugas, Steller sea lions, and their prey forage broadly throughout Cook Inlet rather than 100% at the AWPCF outfall pipe or within the ZID, it is not likely these PPCPs would result in measurable effects to these species or their prey.

Sterols and Hormones

There currently are no State of Alaska or federal water quality standards for hormones or sterols in wastewater or receiving waters (refer to **Section 4.2.4**). However, substances with potentially endocrine-disrupting properties, which have not already been restricted, are now subject to specific screening actions in the U.S. (EPA 2015b, 2023). According to (Grzegorzek et al. 2024), the European Commission and the World Health Organization recommend a threshold value of less than 1 ng/cubic decimeter or 1 ng/L for concentrations of endocrine compounds in wastewater.

Concentrations of sterols and hormones detected in AWPCF effluent were below effect concentrations for prey species/aquatic organisms. Therefore, effects from these compounds are not likely. Rapid dilution of AWPCF effluent at the outfall (refer to (Jacobs 2024)) and the fact that Cook Inlet beluga whales, Western DPS of Steller sea lions, and their prey are migratory (only transiting through the action area), mean that exposure to most sterols and hormones at concentrations below levels do not result in adverse effects on these species.

Two hormones, estrone and equilenin, do not have reliable oral toxicity data for marine mammals and there is uncertainty regarding their effects if detected in effluent (refer to **Appendix C**). Both hormones are estrogens but are considered to be less potent than other forms of estrogens such as estradiol. Detected 17b-estradiol concentrations in AWPCF effluent are not likely to affect belugas or Steller sea lions through food chain uptake because the exposure pathway (which assumes 100% of time spent at the outfall pipe) is not realistic considering these species are highly mobile. For these reasons, the potential effects for sterols and hormones, even considering the uncertainty with estrone and equilenin, are discountable because there is no plausible route of exposure.

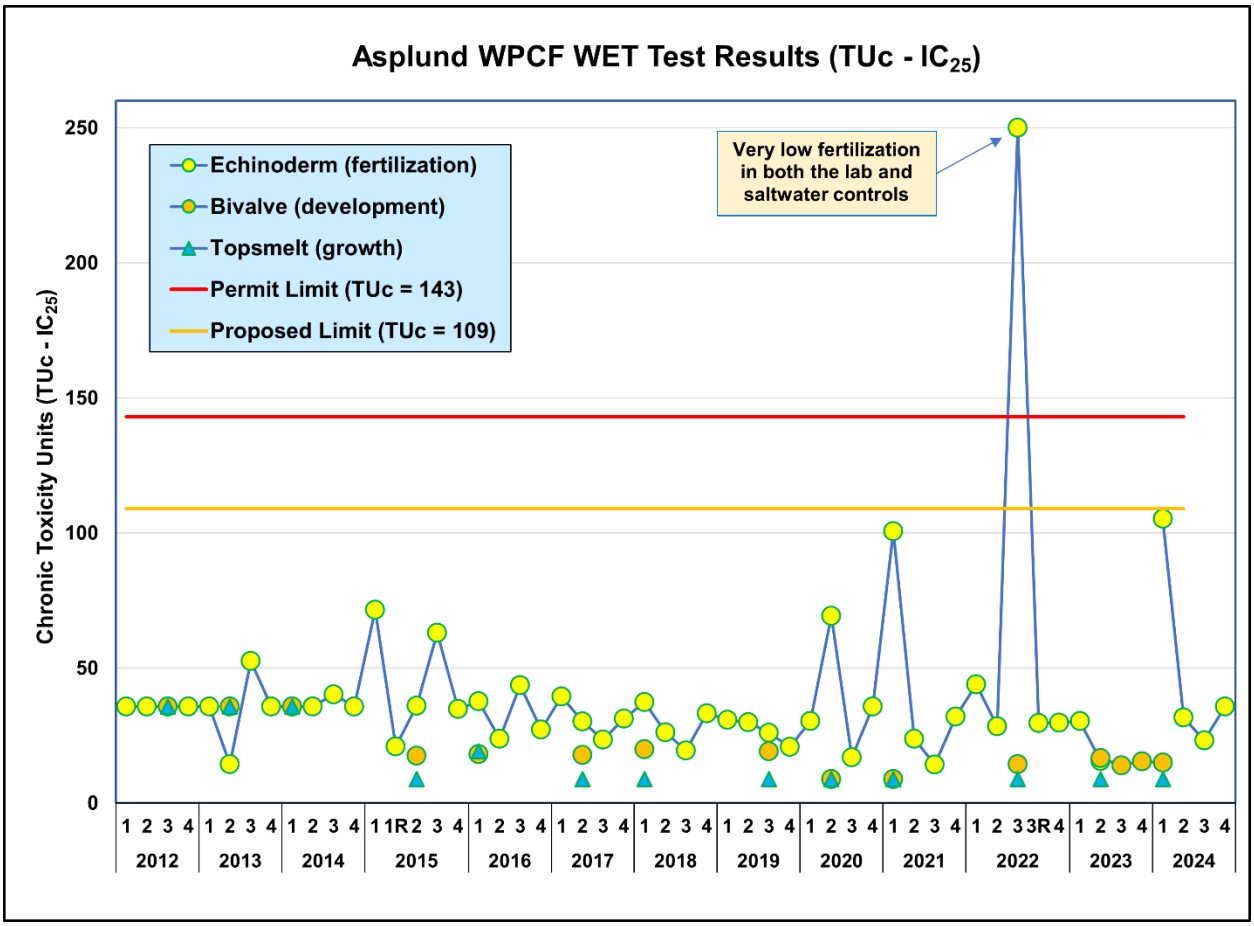
6.1.2 WET Testing Results

Quarterly WET testing has been conducted from 2012 through 2024 as part of the annual monitoring program (Kinnetic Environmental Inc 2023a, 2024a). The parameters of the WET testing protocol were established following EPA guidance (EPA 1988, 1995). Screening toxicity tests were completed over the course of three quarters using topsmelt (*Atherinops affinis*) for survival and growth; mussel (*Bivalve* spp.) for larval development, and purple sea urchin (*Strongylocentrotus purpuratus*) for fertilization. The species with the highest sensitivity was used for all subsequent toxicity tests performed that year. The three species screening was repeated each year. The bivalve was the most sensitive species for 2002 and 2003. The purple sea urchin was the most sensitive species for all screenings completed from 2004 through 2024.

The WET testing includes a series of seven dilutions, including the predicted concentration of effluent at the edge of the ZID and a control. The trigger level set by the permit is chronic toxicity greater than 143 chronic toxicity units (TUc). If the TUc is exceeded, accelerated testing is performed along with an additional WET test. If no toxicity greater than 143 TUc was observed in subsequent tests, then the normal testing schedule is reinstated.

WET toxicity test results for topsmelt, bivalves, and sea urchin are shown on **Figure 6-1**. All results have met the permit limits, except for the initial 2022 third quarter echinoderm test. However, fertilization rates were also low in both the laboratory and saltwater controls. The text was reperformed as required by the permit and returned acceptable results with the retest results below the trigger limit.

Figure 6-1. 2012 – 2024 WET Test Results for Echinoderm



6.2 Ecological Risk Evaluation Results

Results of required chemical monitoring as well as results from the supplemental sampling data collected in support of the BE were evaluated for potential risk to Cook Inlet beluga whales and Steller sea lions in the ecological evaluation (presented in **Appendix C**). The ecological risk evaluation was completed by adapting principles of the approach for risk assessments recommended by EPA (1997,1998, 2001; ADEC 2018) to be applicable to the AWWU-managed AWPCF. The overall objectives of the evaluation were to quantitatively and qualitatively evaluate potential risks to the endangered Cook Inlet beluga whales, their critical habitat, and the Western DPS of Steller sea lions from exposure to residual contaminants present in AWPCF effluent. The process and results are summarized in this section to provide context for the determinations of effects on ESA-listed species potentially affected by the action.

6.2.1 Methodology

AWWU monitors for toxic pollutants and pesticides (collectively referred to herein as contaminants or pollutants) twice annually as a condition of the NPDES permit. Toxic pollutants and pesticides are defined by the permit as substances listed in 40 CFR 401.15. This list includes more than 130 pollutants, including asbestos, VOCs, SVOCs, pesticides, PCBs, metals, and cyanide. Contaminants detected at least once during

AWPCF NPDES effluent monitoring during the period 2015 through 2023 were identified and included in the ecological risk evaluation. In addition, seven classes of CECs (PPCPs, sterols/hormones, pesticides, PBDEs, PFAS, NPs, BPAs, and 6-PPD quinone) were sampled to support the BE. CECs detected at least once during the period 2004 through 2023 were included in the ecological evaluation.

Potential risk from exposure to CECs in AWPCF effluent was evaluated using exposure models developed for Cook Inlet beluga whales, Steller sea lions,[66] and their prey (referred to in the risk evaluation as "receptors"):

- ESA-Listed Marine Mammals. An exposure model evaluated whether bioaccumulation of contaminants from effluent through the food chain could affect Cook Inlet belugas or the Western DPS of Steller sea lions. Measured contaminant concentrations in AWPCF effluent and contaminant concentrations measured in Cook Inlet fish tissue were used to estimate these risks.
- Prey Species. Another model evaluated whether contaminants in AWPCF effluent exist at concentrations sufficient to result in adverse effects to prey species that belugas and sea lions might rely upon for forage. The dilution modeling described in **Section 2.4** (Jacobs 2024) was used to determine dilution of AWPCF effluent contaminants to become diluted when they mix with Cook Inlet receiving waters. Next, expected concentrations of contaminants were compared to aquatic toxicity BMs to estimate the potential for risk to prey species.
- Critical Habitat. The potential for adverse effects to critical habitat for the Cook Inlet beluga whale was evaluated through application of the results of the nearfield and farfield hydrodynamic modeling in the risk estimates for both beluga whales and their prey species.

A two-tiered approach was used to estimate risks for each receptor:

- Tier 1, Preliminary Screening. The preliminary screen provided a conservative evaluation whereby the exposure and toxicity parameters are applied without consideration of site-specific variables that would potentially impact receptor exposure to contaminants. Contaminants with preliminary screening results that indicated a potential for risk were retained for further evaluation in refined risk estimates.
- Tier 2, Refined Assessment. The refined assessment provided a more realistic estimate of potential exposure and risk, including incorporation of site-specific and receptor-specific exposure parameters. Exposure parameters that were included in the refined assessment included migration, varied exposure durations, and area use.

Exposure assumptions from each exposure model were used to provide a range of risk estimates for each exposure scenario/receptor. The exposure scenarios evaluated for Cook Inlet beluga whale and Western DPS of sea lions are summarized in **Table 6-2**. The exposure scenarios evaluated for prey fish are summarized in **Table 6-3**. The exposure and toxicity assumptions are defined following the tables.

[66] While the exposure models do not necessarily differentiate the analysis for the Western DPS as different from any stock of Steller sea lions, the ESA-listed Western DPS is the subject of this BE.

Table 6-2. Exposure Scenarios for Cook Inlet Beluga Whales and Western DPS Sea Lions

Exposure Model	Exposure Area	Exposure Area Size (km^2)	Effluent Dilution Factor	EPC		Migration Factor (Months)
				Screening Exposure Scenario	Refined Exposure Scenario	
Modeled Concentrations in Prey Fish	End of Pipe	--	1	Maximum Detect[a]	RME EPC[a]	12, 9, 6, or 3
	Edge of ZID	0.258	109	Maximum Detect[a]	RME EPC[a]	12, 9, 6, or 3
	Knik Arm	278	1,223	Maximum Detect[a]	RME EPC[a]	12, 9, 6, or 3
	Mid Upper Cook Inlet	590	2,189	Maximum Detect[a]	RME EPC[a]	12, 9, 6, or 3
	Turnagain Arm	700	9,385	Maximum Detect[a]	RME EPC[a]	12, 9, 6, or 3
Measured Concentrations in Fish Tissue	Cook Inlet	20,000	n/a	Maximum Detect[b]	RME EPC[b]	12, 9, 6, or 3

[a] Measured and modeled effluent concentrations are presented in Appendix C, Table C-6.

[b] Measured fish tissue concentrations for detected analytes presented in Appendix C, Table C-4.

Migration Factor (MF) - Represents the amount of time in one year the receptor would be expected to forage within the exposure area.

EPC = exposure point concentration

RME = reasonable maximum exposure

Table 6-3. Exposure Scenarios for Prey Fish

Exposure	Exposure Areas	Dilution Factor[a]	Exposure Point Concentration	
			Preliminary Screening	Refined Assessment
Aquatic Organisms Exposed to Marine Surface Water	End of Pipe	1	Maximum Detect	RME EPC[b]
	Edge of ZID	109	Not evaluated in the Tier 1 Screening	
	Upper Cook Inlet	2,189		
	Knik Arm	1223		
	Turnagain Arm	9385		

[a] Dilution factors determined by the *Outfall Mixing Zone Study* (Jacobs, 2024).

[b] The RME EPC was determined using EPA PROUCL V5.2 (2022).

Exposure Areas

Exposure areas represent geographic areas where data are aggregated for the computation of exposure concentrations and where independent exposure estimates are quantified. For estimating potential risk to prey species, five exposure areas were assessed (refer to **Figure C-2):**

- End of Pipe – The end of the pipe was the only exposure area evaluated in the preliminary screening to identify chemicals to be further evaluated in the refined evaluation. The end of pipe represents the point source of effluent in the three openings of the diffuser and is of negligible surface area (0.8 square meter). The end of the outfall pipe does not represent an area with viable habitat or a realistic exposure area for the identified receptors.
- Edge of the ZID – The edge of the ZID was evaluated only in the refined assessment and is the area encompassed by a 350-meter radial distance from the outfall (0.257 km^2) (**Figure 4-2**).
- Knik Arm – Knik Arm was only evaluated in the refined assessment. It is an extension of Cook Inlet branching north of Anchorage with a coverage of 278 km^2.
- Upper Cook Inlet – Upper Cook Inlet (referred to in the risk evaluation as "mid upper" Cook Inlet) was only evaluated in the refined assessment. In the risk evaluation, the area of the upper Cook Inlet is bounded by the openings into both Knik and Turnagain arms and extending out into the main Cook Inlet channel. Areal coverage is approximately 590 km^2.
- Turnagain Arm – Turnagain Arm was only evaluated in the refined assessment. Turnagain Arm is an extension of Cook Inlet branching south of Anchorage with a coverage of 700 km^2.

Exposure Point Concentration

The exposure point concentration (EPC) represents the concentration of a contaminant to which the receptor is exposed. EPCs for effluent were determined from concentrations measured in the end-of-pipe effluent and then estimated for each exposure area (as applicable) through the application of the exposure area-specific DF developed in the mixing zone study (Jacobs 2024a). For the preliminary screening, the EPCs were based on the maximum detected contaminant concentrations measured in effluent samples from AWPCF and prey fish samples collected in Cook Inlet. For the refined assessment, the EPC was based on the 95% upper confidence limit (UCL95) on the mean for effluent data and prey fish data. This EPC represents the reasonable maximum exposure for each receptor.

Migration Factors

The MF represents the proportion of time a receptor would spend within an exposure area and is used to inform the potential for risk based on different use proportions of the exposure area. The MF was set at predefined durations to provide a range of risk estimates and included 12-, 9-, 6-, and 3-month exposures.

Toxicity Values

Toxicity values for all receptors were based on chronic no effects levels obtained from a hierarchy of sources, including federal and Alaska regulatory values, consensus-based no observed adverse effect levels (NOAELs), and literature-based NOAELs representing chronic endpoints. Use of no effects levels provided the most conservative estimates of potential for adverse effects and are considered protective of ESA-listed species.

6.2.2 Preliminary Screening Results

The preliminary screening was completed using the following most conservative exposure and toxicity assumptions: (1) the maximum detected concentrations of contaminants in effluent measured at the end of the pipe, (2) chronic toxicity values, and (3) that all receptors were exposed to these concentrations for the duration of their lifespan. Based on the overly conservative assumptions used, preliminary screening was used to refine the list of detected contaminants to those that warranted more precise evaluation. Any contaminant that did not exceed effect thresholds in the preliminary screen was considered to not pose a potential for adverse effects to ESA-listed species or their prey. Contaminants with maximum detected effluent concentrations that exceeded effects thresholds (HQs equal to or greater than 1) were retained for further evaluation in the refined assessment.

6.2.2.1 Marine Mammal Screening

End-of-Pipe Modeled Dietary Risk. Contaminants with screening HQs exceeding 1 based on modeled food chain uptake from prey fish tissue that had bioaccumulated contaminants from AWPCF effluent modeled are:

- Beluga Whale
  - PAHs: benz(a)anthracene, benzo(e)pyrene
  - PBDEs: 2,2',4,4',5-PeBDE (BDE-99); 2,2',4,4'-TeBDE (BDE-47)
  - SVOCs: bis(2-ethylhexyl)phthalate
- Steller Sea Lion
  - PAHs: benz(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, perylene
  - PBDEs: 2,2',4,4',5-PeBDE (BDE-99); 2,2',4,4',6-PeBDE; 2,2',4,4'-TeBDE (BDE-47); 2,2',4,5'-TeBDE; 2,3',4,4'-TeBDE
  - Pesticides: 4,4'-DDD; 4,4'-DDE; aldrin; dieldrin
  - SVOCs: bis(2-ethylhexyl)phthalate, di-n-octyl phthalate, n-nitrosodimethylamine

Cook Inlet Measured Fish Dietary Risk. Contaminants detected in fish collected from Cook Inlet and used to estimate exposure and risk to marine mammals are:

- Beluga Whale
  - SVOCs: n-nitrosodimethylamine
- Steller Sea Lion
  - SVOCs: n-nitrosodimethylamine

6.2.2.2 Prey Fish Screening

End-of-Pipe Risk. The following list presents contaminants with screening HQs exceeding 1 at the end of the pipe. They are summarized for 100% exposure to the maximum detected concentrations at the end of pipe.

- Prey Fish
  - Metals: copper (total and dissolved), mercury (total and dissolved), nickel (dissolved), silver (total and dissolved), zinc (total and dissolved)
  - General chemistry: total ammonia, total cyanide

- Pharmaceuticals: diltiazem (antihypertensive)
- Pesticides: aldrin, dieldrin, endosulfan sulfate, endrin ketone, heptachlor, malathion
- PFAS: PFOS
- SVOCs/ PAHs: benzo(a)pyrene, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, indeno(1,2,3-c,d)pyrene, pyrene

6.2.3 Refined Assessment Results

The refined assessment was completed using the more realistic exposure assumptions. Toxicity assumptions were not altered from the preliminary screening (no effect level toxicity values were used). The UCL95 of measured and modeled fish concentrations and modeled effluent concentrations for each exposure area were used. In addition, 12-, 9-, 6-, and 3-month exposure durations were evaluated.

6.2.3.1 Marine Mammal Refinement

The results of the refinement based on modeled or measured fish tissue concentrations are presented in **Table 6-4** summarized as:

- Modeled Dietary Uptake – No contaminants were found to pose a risk to Cook Inlet beluga whales or Western DPS of Steller sea lions potentially using the ZID, Knik Arm, mid upper Cook Inlet, or Turnagain Arm exposure areas under any of the exposure durations evaluated, including 3-month, 6-month, 9-month, and 12-month exposures.
- Measured Dietary Uptake – Only one contaminant was found to pose a potential for risk to the Steller sea lion based on measured fish tissue data for Cook Inlet. n-Nitrosodimethylamine had refined HQs exceeding 1 for Western DPS Steller sea lions under both 9-month and 12-month exposure durations. No estimated risks were identified for the 3-month or 6-month exposure durations. There were no contaminants with potential for risk to Cook Inlet beluga whales or Steller sea lions using measured fish tissue data for any of the exposure durations.

6.2.3.2 Prey Fish Refinement

The results of the refinement based on modeled effluent concentrations for each exposure area are presented in **Table 6-5** and summarized as:

- Direct Contact/Ingestion – No contaminants detected in the end-of-pipe effluent that would pose an unacceptable risk to aquatic organisms or prey fish in the ZID, Knik Arm, mid upper Cook Inlet, or Turnagain Arm exposure areas.

Table 6-4. Refined Risk Summary – Cook Inlet Beluga Whales and Western DPS of Steller Sea Lions

Exposure Area	Exposure Media	Analytes Posing Potential Risk	Refined No Effect Level HQs								Determination of Potential Impacts
			12-Month Exposure Duration		9-Month Exposure Duration		6-Month Exposure Duration		3-Month Exposure Duration		
			Beluga Whale	Steller Sea Lion	Beluga Whale	Steller Sea Lion	Beluga Whale	Steller Sea Lion	Beluga Whale	Steller Sea Lion	
ZID (350meters)	Effluent x DF	none	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	No contaminants retained for further evaluation. Effluent is *not likely to adversely affect* ESA-listed species or their critical habitat within the ZID.
Knik Arm	Effluent x DF	none	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	No contaminants retained for further evaluation. Effluent is *not likely to adversely affect* ESA-listed species or their critical habitat within Knik Arm

Exposure Area	Exposure Media	Analytes Posing Potential Risk	Refined No Effect Level HQs								Determination of Potential Impacts
			12-Month Exposure Duration		9-Month Exposure Duration		6-Month Exposure Duration		3-Month Exposure Duration		
			Beluga Whale	Steller Sea Lion	Beluga Whale	Steller Sea Lion	Beluga Whale	Steller Sea Lion	Beluga Whale	Steller Sea Lion	
Mid Upper Cook Inlet	Effluent x DF	none	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	No contaminants retained for further evaluation. Effluent is *not likely to adversely affect* ESA-listed species or their critical habitat within Mid-Upper Cook Inlet
Turnagain Arm	Effluent x DF	none	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	No contaminants retained for further evaluation. Effluent is *not likely to adversely affect* ESA-listed species or their critical habitat within Turnagain Arm.

Exposure Area	Exposure Media	Analytes Posing Potential Risk	Refined No Effect Level HQs								Determination of Potential Impacts
			12-Month Exposure Duration		9-Month Exposure Duration		6-Month Exposure Duration		3-Month Exposure Duration		
			Beluga Whale	Steller Sea Lion	Beluga Whale	Steller Sea Lion	Beluga Whale	Steller Sea Lion	Beluga Whale	Steller Sea Lion	
Cook Inlet	Fish Tissue	N-Nitrosodimethyl-amine	<1	2E+00	<1	1E+00	<1	<1	<1	<1	N-nitrosodimethylamine may pose potential for adverse effects to the sea lion only under a 12-month exposure scenario. N-nitrosodimethylamine is *not likely to adversely affect* the Steller sea lion under anticipated migration patterns and exposure durations.

Table 6-5. Refined Risk Summary – Prey Fish

Exposure Area	Exposure Media	Analytes Posing Potential Risk	Refined HQs	Determination of Potential Impacts
ZID (350 meters)	Effluent x DF	none	All HQ < 1	No contaminants retained for further evaluation. Effluent is *not likely to adversely affect* prey species within the ZID.
Knik Arm	Effluent x DF	none	All HQ < 1	No contaminants retained for further evaluation. Effluent is *not likely to adversely affect* prey species within the Knik Arm.
Mid-Upper Cook Inlet	Effluent x DF	none	All HQ < 1	No contaminants retained for further evaluation. Effluent is *not likely to adversely affect* prey species within Mid-Upper Cook Inlet.
Turnagain Arm	Effluent x DF	none	All HQ < 1	No contaminants retained for further evaluation. Effluent is *not likely to adversely affect* prey species within Turnagain Arm.
--	Effluent	Oil and Grease, Total (HEM)	Uncertainty	Uncertainty[a]

[a] Uncertainty exists for oil and grease mixture toxicity; many combinations of mixtures may exist. Petroleum hydrocarbons, oil, and grease mixtures are evaluated as individual components of SVOCs, VOCs, and PAHs

-- - not applicable

6.2.4 Risk Evaluation Summary

The ecological risk evaluation results and conclusions are presented in **Table 6-4** and **Table 6-5**, respectively. The overall conclusions of the ecological risk evaluation are summarized below:

- *Cook Inlet Beluga Whales*. Potential for risk to Cook Inlet beluga whales from the bioaccumulation of contaminants detected in AWPCF effluent was evaluated. Contaminant concentrations in modeled and measured fish were compared to No Effect oral dose toxicity data to estimate the potential for risk. The results of the evaluation indicate that no contaminants detected in AWPCF effluent are likely to pose a risk to Cook Inlet beluga whales through food chain uptake.
- *Western DPS of Steller Sea Lions*. Potential for risk to Steller sea lions from the bioaccumulation of contaminants detected in AWPCF effluent was evaluated. Contaminant concentrations in modeled and measured fish were compared to No Effect oral dose toxicity data to estimate the potential for risk. The results of the evaluation indicate that no contaminants detected in AWPCF effluent are likely to pose risk to the Western DPS of Steller sea lions through food chain uptake.
- *Prey Species*. Potential risk from contaminant concentrations measured at the end of the pipe and modeled at the edge of the ZID, mid upper Cook Inlet, Knik Arm, and Turnagain Arm were compared to chronic No Effect toxicity data protective of aquatic organisms to determine if concentrations could affect prey species integral to endangered marine mammal health. The results of the evaluation indicate that no contaminants detected in AWPCF effluent are likely to pose risk to prey species.

Chemical-specific results are also discussed in **Section 6** for key chemical groups. The conclusions from the ecological risk evaluation presented in detail in **Appendix C** were used to inform the ESA Section 7 determinations presented in **Section 7** of this BE.

6.3 Cumulative Effects

Under the ESA, cumulative effects are defined as those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation (50 CFR § 402.02). Since future federal actions that are unrelated to the proposed action require separate consultation pursuant to Section 7 of the ESA, they are not considered in this section.

The following subsections describe the future state or private activities reasonably certain to occur within the action area and their potential contribution to cumulative effects on Cook Inlet beluga whales, the Western DPS of Steller sea lions, and their habitats, including prey species.

6.3.1 Local Infrastructure and Transportation

AIA plays a key role in international and domestic cargo transportation and is a vital transportation asset for Alaska residents and visitors. In 2024, several construction projects at the airport were initiated and are expected to continue in similar fashion in the near term. As of April 2024, airport improvement projects included fuel tank replacements, Postmark Drive repairs, runway drainage improvements and repairs, taxiway repairs and improvements, and small bridge replacements.[67] The *Ted Stevens Anchorage International Airport Master Plan Update*[68] is currently being finalized. In accordance with Federal Aviation

[67] https://dot.alaska.gov/creg/project_info/; Accessed October 4, 2024.
[68] https://ancmpu.com/ Accessed August 1, 2025

Administration requirements, the final updated plan will consist of a comprehensive study that envisions short-, medium-, and long-term development plans for the facility (AIA 2024).

As described in **Section 4.4**, the Port of Alaska is a major hub for cargo in and out of the state. In 2019, approximately 4.3 million tons of fuel and cargo were moved through the port. Goods consumed by 90% of the Alaska population are moved through the Port of Alaska. The port also supports national defense and is identified as a U.S Commercial Strategic Seaport immediately adjacent to JBER.[69] Given how important the Port of Alaska is to the state's commerce, national defense, and emergency response, port activities will continue. Port MacKenzie will also continue to be used to transfer goods; plans to improve the port have been summarized in **Section 4.4**. The future effects of these potential changes are currently unknown. Vessel traffic, maintenance, and repairs of the two ports result in underwater sound in upper Cook Inlet that may affect Cook Inlet beluga whales while they are present in upper Cook Inlet during summer months, primarily May through September. Exposure of belugas to underwater sound is likely to contribute to adverse cumulative effects on the whales although the magnitude and extent of these effects are difficult to quantify.

6.3.2 Urban Development

Human activities in the action area that result in discharges or disturbance to the action area are reasonably certain to continue in the future. However, the level of effects from such activities cannot be projected without site- or project-specific evaluations. Sources of contamination in the action area include stormwater runoff from coastal development, groundwater discharges, atmospheric loading of pollutants, and industrial activities. **Section 4.2** discusses the EPOCs detected in samples not related to AWPCF effluent (stormwater runoff) and **Table 4-8** shows that PFOA and PFAS, 4-nonylphenol, bisphenol E, and 17-alpha-estradiol were detected in stream and stormwater samples not associated with AWPCF effluent. These EPOCs and other contaminants can make their way from Chester, Fish, and Ship creeks and the stormwater outfall at Postmark Drive to the waters of upper Cook Inlet.

The *2040 Anchorage Land Use Plan* (MOA 2017a) provides a vision for growth from 2020 to 2040 that includes balancing development while retaining Anchorage's critical environmental lands and natural setting. Section 2 of the Land Use Plan (MOA 2017b) explains that there are 14 neighborhood, district, and other area-specific plans that have been adopted for 70 different land uses within the MOA. These land uses generally fall into seven categories, including neighborhoods, centers (that is, city center), corridors (commercial or main street), open spaces, facilities and institutions, industrial areas, and growth-supporting features (that is, residential mixed-use development). The Anchorage population growth forecast as of publication of the 2040 Land Use Plan was 0.8% with as many as 47,000 residents and 21,000 households in the Anchorage Bowl (MOA 2017a).

In addition to general urban growth, there are other specific projects within or adjacent to the action area that may result in changes to environmental conditions. Construction of the Fish Creek Trail Connection is expected to begin in 2025 and consists of constructing a multi-use path between Northern Light Boulevard and the Tony Knowles Coastal Trail located northeast of AWPCF. In a 2024 ESA Letter of Concurrence, NMFS stated that while there may be habitat alterations for beluga prey species (Pacific salmon, Pacific eulachon, Pacific cod, walleye pollock, saffron cod, and yellowfin sole), the effects from the Fish Creek Trail project activities are expected to be discountable based on the extremely small project footprint (NMFS 2024c).

[69] https://www.portofalaska.com/about-us/; Accessed October 10, 2024.

The West Anchorage Snow Disposal Project[70] involves constructing a new snow disposal site for the MOA beginning in 2025. The new site will be located approximately 6.5 kilometers from Point Woronzof, adjacent to the west side of Minnesota Drive and south of De La Vega Park. Currently, snow disposal for West Anchorage is located at the airport adjacent to the action area. Therefore, as snow melts at the current site during spring months, any contaminants that may exist in the snow are likely discharged adjacent to or within the action area. While it is difficult to assess at this time how the project could change water quality conditions in the action area, the new Connor's Bog West Anchorage Snow Disposal site may reduce the concentrations of pollutants that may exist in the snow collected from local roadways (PAHs, heavy metals, 6-PPD quinone) considering the distance from shore.

While excessive turbidity from coastal development or construction sites could influence the health of belugas and their prey, Cook Inlet has a naturally high sediment load. Therefore, the cumulative contribution of changes in sediment loading from urban sources to the action area and any subsequent effects on beluga whales are difficult to assess.

6.3.3 Other Municipal Sewage Treatment Facilities and Discharges

NPDES and state permits will continue to authorize point and nonpoint source discharges from municipalities and industrial sources in the action area. State and federal standards are set to avoid or reduce the potential impacts to receiving waters using EPA's techniques and, therefore, are not expected to change from baseline conditions.

6.3.4 Fisheries

On April 29, 2024, NMFS published a final rule to implement Amendment 16 to the FMP for the Salmon Fisheries in the EEZ off Alaska (NMFS 2024e), which was later modified on May 29, 2024, to include the correct length for drift gillnet gear of 200 fathoms (365.76 meters) (NMFS 2024f). Amendment 16 of the Salmon FMP modifies the existing FMP to include the Cook Inlet EEZ in the FMP's fishery management unit, which thereby applies criteria of the Magnuson-Stevens Act to salmon fisheries activities in this area. Effectively, Amendment 16 changes salmon fisheries from state to federal management in Cook Inlet.

Based on an analysis of the proposed rule for Amendment 16 published on June 22, 2023 (88 FR 40753 and 88 FR 40764), NMFS concluded that the change in salmon fishery management in Cook Inlet may affect, but is not likely to adversely affect, the Western DPS of Steller sea lions, Mexico DPS of humpback whales, WNP DPS of humpback whales, fin whales, or Cook Inlet beluga whales and their critical habitat.

In the Letter of Concurrence published by NMFS (NMFS 2024d), the agency concluded that across all seasons, harvest levels from participants in the Cook Inlet EEZ drift gillnet fishery are expected to remain similar to or slightly decreased from existing harvest levels. The timing of the harvest may change under the new management regime; however, with the potential for more fish to be harvested during the July 16 timeframe compared to August 1 to 15.

Within the action area for the AWPCF NPDES permit, no additional drift gillnet harvest is expected in the Northern District of State Waters because this area is closed to that gear group. So, while shifts in harvest from the EEZ to State Waters may disperse an unknown amount of fishing pressure on some salmon runs, changes in state escapement goals are not expected (NMFS 2024d). While fisheries harvest is likely to

[70] https://www.westanchoragesnow.com/wp-content/uploads/2021/03/West-Anch-Snow-Disposal-Final-Site-Selection-Study_02-15-2021.pdf; Accessed October 4, 2024.

contribute some adverse cumulative effect on the availability of prey, the extent and magnitude of these effects on these populations is currently unknown.

6.3.5 Oil and Gas Activities

Oil and gas activities in Cook Inlet do not directly overlap with the action area because they occur in mid- and lower Cook Inlet approximately 100 kilometers or farther away. Oil and gas activities in Cook Inlet were evaluated in a 2019 NMFS Biological Opinion, which considered these activities 30 years into the future. Detailed mitigation measures are prescribed for future activities including shutting down work when beluga whales are seen at any distance from project sites. These measures are expected to reduce the potential contribution of oil and gas work to cumulative effects on belugas, although some amount of disturbance may still occur. Exposures to noise at received levels that could cause harassment to any listed whales are expected to be minimal (NMFS 2019b).

The current NPDES permit (ADEC 2021) limits the discharges of drilling fluids and drill cuttings; deck drainage; domestic wastewater; graywater; desalination unit wastes; blowout preventer fluid; boiler blow-down; fire control system test water; noncontact cooling water; uncontaminated ballast water; bilge water; excess cement slurry; muds, cuts, and cement at the seafloor; waterflooding (filter backwash); produced water; completion fluids; workover fluids; well treatment fluids; other test fluids; and hydrostatic test water (**Appendix D**). These constituents are monitored at specified intervals and will continue to be managed under the permitting system. Discharges are likely to continue to be prohibited at certain locations, such as within 4,000 meters of a coastal marsh or river delta and offshore of protected areas, including the Susitna Flats and Palmer Hay Flats State Game Refuges in upper Cook Inlet (ADEC 2021), and mixing zones are also likely to remain a key mechanism for managing discharges of turbidity, aluminum, antimony, aromatic hydrocarbons, arsenic, barium, beryllium, cadmium, chromium, copper, fecal coliform bacteria, iron, lead, mercury, nickel, selenium, silver, thallium, TRC, zinc, and whole effluent toxicity at levels that exceed the chronic AWQS and/or NRWQC specified in the ADEC (2021) permit.

While oil and gas actions do not directly overlap with the AWPCF action area, Cook Inlet belugas may be exposed to underwater sound, habitat alteration, or general disturbance across their range (NMFS 2019b). Large or chronic oil spills could have cumulative effects or a large oil spill could result in mortality or reduced fitness, although the risk of a large spill is expected to be low given the mitigation measures implemented by industry (BOEM 2021).

The oil and gas industry also conducts routine maintenance activities in the area; however, most activities are approximately 65 kilometers or more south of the action area. Maintenance activities include subsea pipeline inspections, pipeline stabilization, and repair and replacement; platform leg inspections and repairs; and anode sled installations. Routine maintenance activities involve the use of a range of equipment and hand-held tools. Some of these maintenance and repair activities were evaluated in a 2022 Letter of Concurrence from NMFS, which stated that the agency concurred with the determination that maintenance and repairs to oil and gas infrastructure may affect, but are not likely to adversely affect, fin whales, WNP DPS of humpback whales, Mexico DPS of humpback whales, Cook Inlet beluga whales, Western DPS of Steller sea lions, or designated critical habitat for Cook Inlet beluga whales.

6.3.6 Climate Change

Changes to climate are expected to continue and may impact Cook Inlet beluga whales in the action area either through effects to the species, habitat, or their prey. Declines in salmon abundance are evident in Cook Inlet (refer to **Section 4.3**) and, while there may be many contributing factors that could be attributed to the declines, changes in climate are likely one contributing factor. Other marine fish species

may also experience habitat changes, which could result in changes in abundance and their availability as prey for belugas or Steller sea lions that may pass through the action area. Given the number of variables related to climate change and the unknown rate of those future changes, the specific contribution of climate change to effects on beluga whales or their habitat is difficult to predict (NMFS 2019a).

7. Weight of Evidence Evaluation

In accordance with the requirements of Section 7(a) of the ESA and consistent with ESA guidance, this BE provides a synthesis of the best available scientific information to assist in the completion of formal consultation on the proposed action. To assist NMFS in its review, this assessment has evaluated the extent to which ESA-listed marine mammal species and their critical habitats are likely to be affected by EPA's reissuance of an NPDES permit with Section 301(h) modifications for the continued operation of the AWWU AWPCF in Anchorage, Alaska. A WOE approach was used to organize and evaluate the supporting information for this determination. This section summarizes the WOE and conclusions drawn from all the lines of evidence.

7.1 WOE Considerations

The larger categories and lines of evidence placed in each category were described in **Section 1** and summarized in **Table 1-1**. The consideration of lines of evidence for each category and their potential to adversely affect ESA-listed species and their critical habitat are summarized in the following subsections.

7.1.1 Consideration of Site Description

Lines of evidence evaluated under the general site description category describe details of the AWPCF, including pretreatment programs, treatment system, and outfall design, as well as details specific to the NPDES permit for the AWPCF such as current permit requirements for annual monitoring and WET testing. The pretreatment program, treatment system, and outfall were designed for minimal impact to the discharge body of water. The annual monitoring program was designed specifically for this site to confirm the AWPCF is working as designed. Supplemental studies conducted from 2022 through 2024 in support of the permit renewal included sampling of water and biota, completion of an updated hydrodynamic model, and revision to the recommended ZID. Evaluation of the monitoring results is included under the baseline environmental conditions and the ecological risk evaluation; they are included as lines of evidence for those sections.

Effluent at the outfall mixes with ambient seawater after it exits the outfall diffuser, diluting the initial concentrations of contaminants. The *Outfall Mixing Zone Study* (Jacobs, 2024a) applied hydrodynamic modeling using field-measured inputs to establish a proposed regulatory mixing zone with a dilution factor of 109 at a 350-meter ZID for use in the NPDES 301(h)-modified permit. The farfield model predicts the fate, transport, and mixing beyond the ZID boundary and was used to estimate concentrations of contaminants in upper Cook inlet, Turnagain Arm, and Knik Arm. The dilution factor of 109 at the ZID boundary is estimated under peak discharge critical conditions (10% flood tide MLLW) representing a worst-case scenario for dilution where the least amount of dilution is expected to occur. Dilution by seawater has a direct effect on the expected concentrations of contaminants to which receptors (belugas, sea lions, or their prey) are exposed and, as a result, directly affects risk estimates. The application of the dilution factor of 109 under critical conditions overestimates the potential for risk in comparison to annual average conditions.

7.1.2 Consideration of the Action Area

The ZID under the current NPDES permit is a 650-meter radial distance from the AWPCF outfall at Point Woronzof (**Figure 2-4**). The action area for this BE is defined based on the updated hydrodynamic modeling, which recommends a revised ZID of 350-meter radial distance from the AWPCF outfall. The

intent of the ZID is to encompass the area within which effluent constituents are mixing with waters in Cook Inlet.

The revision of the ZID from 650 meters to 350 meters results in a smaller area within which permit requirements must be met. Evaluation of potential risks to ESA-listed species and their prey based on the revised ZID/action area is a more conservative evaluation than would be conducted using the current permitted ZID.

7.1.3 Consideration of the Baseline Environmental Condition

A summary of the baseline conditions considered applicable to the WOE is provided here; a complete synthesis of the baseline conditions is provided in **Section 4**.

7.1.3.1 Physical Setting

As described in detail in Section 4.1, the physical conditions of Cook Inlet, including size, shape, and bathymetry, generate a funneling effect that, combined with tidal resonance, produces some of the highest tidal amplitudes in the world. In addition, the maximum distance that a parcel of water would transport during a full tidal cycle is as high as 37 kilometers in upper Cook Inlet. Substrate in the vicinity of the action area is scoured by high currents and tidal flows that do not allow suspended sediments to accumulate around the AWPCF outfall. Subtidal surface sediment samples from both the AWPCF outfall vicinity and a control site near Point MacKenzie consisted of only cobbles; no fine-grained sediments were obtained from either sampling location (Jacobs 2023). The seabed in the vicinity of Point Woronzof and the action area is composed of coarse gravel, cobble, and rocks, which naturally armor the seabed and protect it from erosion by the swift tidal currents. These factors contribute to a rapid dilution of effluent from the AWPCF outfall when it enters Cook Inlet.

7.1.3.2 Biological Setting

The biological conditions in Cook Inlet are impacted by the physical setting. As described in detail in Section 4.3, algae, eelgrass beds, and kelp forests comprise marine and estuarine flora habitat in protected estuaries but are limited in Cook Inlet. Similarly, the benthic invertebrate community is impacted by the high currents and turbidity. Overall invertebrate numbers, diversity, and distribution are lower in Knik Arm and in the vicinity of the action area than invertebrate communities in central and lower Cook Inlet, where tidal currents are reduced.

Cook Inlet is a migratory corridor and early life rearing area for all five species of Pacific salmon: Chinook, sockeye, coho, chum, and pink (see Section 4.3.3.1 for additional details). It contains many freshwater streams that are important spawning habitat for these species. Genetic analyses of Chinook salmon caught in recreational fisheries in Cook Inlet indicate that almost all Chinook salmon harvested in Cook Inlet are "feeders" from populations outside of the inlet, especially during the fall and winter months.

As described in Section 4.3.3.1, Pacific salmon returns in Alaskan waters have been declining, which has led to restrictions in both directed fisheries, by catch in fisheries directed at other species, and recreational fisheries. Recent declines in Cook Inlet Chinook salmon populations have been attributed in part to climate-driven changes in temperature and streamflow in freshwater habitats (Jones et al. 2020, Mauger et al. 2023). Declines in Cook Inlet salmon populations have been linked to large-scale climate drivers, but uncertainty remains about the role of local conditions (precipitation, streamflow, and stream temperature) that vary among the watersheds where salmon spawn and rear. An emergency order closing Ship Creek to

sport fishing for all species was issued in August 2024 based on low coho counts in the hatchery raceway and results of a partial survey.

The biological setting of Cook Inlet provides habitat and prey fish for the Cook Inlet beluga whales and Steller sea lions. Adverse effects on the abundance of prey species may also potentially impact Cook Inlet beluga whales and Steller sea lions; however, based on the analytical results presented herein, it is highly unlikely that effluent from AWPCF will adversely affect the Cook Inlet food chain.

7.1.4 Anthropogenic Conditions

Anthropogenic sources of disturbance, pollutants or other stressors also contribute to the potential for impacts on ESA-listed species and their critical habitat. Section 4.4 provides a summary of the current anthropogenic activities in Cook Inlet including but not limited to shipping, fisheries, urban development and associated runoff, oil and gas activities, and the international airport. These activities are expected to continue into the future in Cook Inlet.

7.1.5 Consideration of ESA-Listed Species

Details for ESA-listed species and critical habitats were presented in **Section 5**. Cook Inlet provides habitat for beluga whales, Steller sea lions, and their prey species. Historically, beluga whales have been distributed throughout Cook Inlet, with occasional sightings in the Gulf of Alaska (Huntington 2000, Laidre et al. 2000, Moore et al. 2000, Rugh et al. 2000). However, in the 2000s, the range of the Cook Inlet beluga whale contracted to mostly the upper and middle waters of Cook Inlet (Shelden et al. 2018). While beluga whales remain in the inlet year-round, there are seasonal shifts in their distribution generally influenced by prey availability, ice coverage, and peak river discharge events (Goetz et al. 2012, Hobbs et al. 2005, Rugh et al. 2010, Shelden et al. 2017, Shelden et al. 2013). During the ice-free months, belugas are concentrated near river mouths in upper Cook Inlet, dispersing and moving into middle and lower Cook Inlet waters during the winter (Polasek et al. 2015, Shelden et al. 2015). The surge of eulachon in April and May, and salmon in May and again in July through October, draws Cook Inlet belugas to important foraging areas near river mouths in upper Cook Inlet during these ice-free periods (McGuire et al. 2020, Moore et al. 2000, Quakenbush et al. 2015b). Cook Inlet and the three larger exposure areas of Middle Cook Inlet, Knik Arm, and Turnagain Arm provide integral habitat for Cook Inlet beluga whales and their prey and, to a lesser extent, for Steller sea lions, although the Western DPS of Steller sea lions is considered infrequent in the action area.

The action area defined in **Section 3** is highly scoured from tides and currents; therefore, it presents limited habitat in comparison to other highly productive areas of Cook Inlet. The action area does not sustain major foraging opportunities for prey fish or marine mammals. Aerial survey and land- and vessel-based monitoring data suggest Cook Inlet beluga whales transit through the area off Point Woronzof and do not actively feed there for any notable period of time. Rather, belugas are known to spend the most time near river mouths such as the Susitna Delta and other areas where foraging opportunities are high. Estimated risk within the ZID for food chain uptake, therefore, represents an overestimation of risk, considering that receptors (belugas or sea lions) would not likely feed only on prey fish that spend 100% of their time exposed to modeled conditions in the ZID area and that the proportion of time they would spend within the ZID is overestimated on a most conservative basis.

7.1.6 Consideration of Potential Effects of the Action

7.1.6.1 Evaluation of AWPCF Monitoring Program Results

The results of AWPCF effluent monitoring summarized in **Appendix A** were used in the ecological risk evaluation presented in **Appendix C**. AWWU has met permit requirements since its inception. The results of the WET testing from 2012 to 2024 show that permit requirements have been met—with the exception of one echinoderm (sea urchin) test for third quarter of 2022. The echinoderm fertilization test exceeded the proposed chronic toxicity permit limit of the 350-meter ZID (dilution factor of 109); however, this test was qualified with poor survival in the lab and receiving water controls, suggesting the result was not likely from effluent conditions (Kinnetic Environmental Inc. 2024a). Subsequent WET tests yielded results with low measurable toxicity. Overall, the WET test results indicate that AWPCF effluent is not likely to pose risk to prey species based on low laboratory-observed toxic effects from multiple test species.

7.1.6.2 Evaluation of Ecological Exposure and Risk

Potential exposure and risk to Cook Inlet beluga whales, Steller sea lions, and their prey species were evaluated for detected concentrations in effluent measured at the end of the pipe as well as for four exposure areas that encompass critical habitat for the Cook Inlet beluga whale: (1) the edge of the ZID, (2) Knik Arm, (3) mid upper Cook Inlet, and (4) Turnagain Arm. Species-specific exposure factors, including the amount of time beluga whales or Steller sea lions could be exposed to a contaminant in each exposure area, were considered.

The ecological risk evaluation results and conclusions are presented in **Appendix C**. The overall conclusions of the ecological risk evaluation are:

- *Cook Inlet Beluga Whales*. Potential for risk to Cook Inlet beluga whales from the bioaccumulation of contaminants detected in AWPCF effluent was evaluated. Contaminant concentrations in modeled and measured fish were compared to No Effect oral dose toxicity data to estimate the potential for risk. The results of the evaluation indicate that contaminants detected in AWPCF effluent are not likely to pose risk to Cook Inlet beluga whales through food chain uptake.
- *Western DPS of Steller Sea Lions*. Potential for risk to Steller sea lions from the bioaccumulation of contaminants detected in AWPCF effluent was evaluated. Contaminant concentrations in modeled and measured fish were compared to No Effect oral dose toxicity data to estimate the potential for risk. The results of the evaluation indicate that contaminants detected in AWPCF effluent are not likely to pose risk to Western DPS of Steller sea lions through food chain uptake.
- *Prey Species*. Potential risk from contaminant concentrations measured at the end of the pipe and modeled at the edge of the ZID, in mid upper Cook Inlet, in Knik Arm, and in Turnagain Arm were compared to chronic No Effect toxicity data protective of aquatic organisms to determine if concentrations could affect prey species integral to endangered marine mammal health. The results of the evaluation indicate that contaminants detected in AWPCF effluent are not likely to pose risk to prey species.

Chemical-specific results are also discussed in **Section 6** and presented in **Table 6-4** and **Table 6-5** for each exposure area/receptor.

Uncertainties are inherent in all risk assessments/evaluations because of the limitations of the available data and the need to make certain assumptions and extrapolations based on incomplete information.

Potential uncertainties and limitations include data, exposure assumptions, exposure models, toxicity and bioavailability, and risk estimation. The uncertainties and limitations considered during the ecological evaluation are presented in **Table C-21.**

Toxicity effects BMs for prey species were available for all detected contaminants except for oil and grease. In some instances, surrogates with similar structures were used. Dietary intake toxicity reference values for mammals were available for all detected contaminants except for oil and grease, total ammonia, selected PFAS compounds, and some CECs. Oil and grease as mixtures are not typically evaluated in risk assessments since mixtures within a given category can have considerable variation in overall composition. Anthropogenic hydrocarbon-related contamination is evaluated based on individual chemical components (PAHs and others). Ecological toxicity of PFAS is a rapidly changing science, so toxicity BMs and toxicity reference values were not available for all detected PFAS. Potential risks from PFAS were evaluated using the best available information. CECs without toxicity reference values include some pharmaceuticals, pharmaceutical metabolites, and personal care products. Available literature was evaluated to identify valid toxicity exposures for these contaminants and no available or validated data were identified. There is uncertainty in determining the potential toxicity of these contaminants from oral uptake. However, the quarterly whole effluent toxicity testing indicates low toxicity for the sea urchin test species. Sea urchin fertilization test methods are considered highly sensitive and evaluate the aggregate toxicity of contaminants in effluent. Sea urchin fertilization tests can indicate potential toxicity from environmentally relevant concentrations of contaminants such as estrogens (Roepke et al. 2005), PFAS (Hayman et al. 2021), and other contaminants that often occur in mixtures. While the potential effects of contaminants without toxicity data are uncertain, potential effects are not likely when aggregate toxicity is evaluated.

7.1.6.3 Evaluation of Cumulative Effects

Cumulative effects under ESA are defined as those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur within the action area of the federal action subject to consultation. Cumulative effects were discussed in **Section 6.3.**

- Activities and their associated potential impacts to ESA-listed species that are expected to remain unchanged from the current conditions include:
  - Municipal sewage
- Activities and their associated potential impacts to ESA-listed species that are expected to increase in the future include the following:
  - Noise
  - Climate change
- Activities for which the future potential impacts to ESA-listed species are uncertain include:
  - Local infrastructure and transportation
  - Urban sources
  - Oil and gas production
  - Fisheries

7.1.6.4 Synthesis of Literature and Research on Relevant Pollutants and Their Effects on Marine Species

A synthesis of scientific literature and existing research regarding potential effects of chemical contaminants on prey species and ESA-listed species (where available) was completed to provide additional support for the conclusions drawn in from the review of annual monitoring results and the ecological evaluation. The synthesis is presented in **Appendix F**.

7.2 Determination of Effects to ESA-Listed Species

Table 7-1 summarizes the effect determinations for ESA-listed marine mammals and their designated critical habitats in the AWPCF action area based on the best scientific information and evaluation of multiple lines of evidence. The proposed action ***may affect, but is not likely to adversely affect***, Cook Inlet beluga whales. The action area occurs within designated critical habitat for Cook Inlet beluga whales, but the proposed action is not expected to adversely affect any of the critical habitat PBFs, including primary prey fish such as salmon, eulachon, or cod. The proposed action ***may affect, but is not likely to adversely affect***, Steller sea lions and there is no designated critical habitat for this species within the action area or the upper Cook Inlet. Based on the risk evaluation summarized in **Section 6.2** and presented in **Appendix C**, no contaminants are likely to occur at concentrations in the action area (within the ZID or beyond the ZID boundary) that could result in adverse effects. In other words, based on the risk evaluation and using the ESA definitions defined at the beginning of **Section 7**, the effects of AWPCF effluent discharge are considered discountable for the contaminants evaluated in this BE.

The proposed action will not affect humpback and fin whales or sunflower sea stars (a candidate species). The proposed action will not occur in critical habitat (if designated) for any of these species.

The proposed action is not expected to cause the incidental "take" of any ESA-listed species.

Table 7-1. ESA-Listed and ESA Candidate Species, Status, Designated Critical Habitat, and Effects Determinations

Common Name	Stock or DPS	Scientific Name	ESA Status	Determination of Effect	Designated Critical Habitat in Action Area?	Adverse Effect on Critical Habitat?
Beluga Whale[a]	Cook Inlet	*Delphinapterus leucas*	Endangered	May Affect, Not Likely to Adversely Affect	Yes	No
Steller Sea Lion[a,b]	Western U.S. Stock[a]	*Eumetopias jubatus*	Endangered	May Affect, Not Likely to Adversely Affect	No	No
Humpback Whale[b]	Mexico N. Pacific Stock	*Megaptera novaeangliae*	Threatened	No Effect; not expected in action area	No	No

Fin Whale[b]	Northeast Pacific Stock	*Balaenoptera physalus*	Endangered	No Effect; not expected in action area	Not Designated	Not Designated
Sunflower Sea Star[b]	N/A[b]	*Pycnopodia helianthoides*	Candidate	No Effect; not expected in action area	Not Designated	Not Designated

[a] Managed under NMFS jurisdiction.

[b] As noted in the Draft 2023 SAR (Young et al. 2024) this stock is equivalent to the ESA-listed Western DPS.

[c] N/A = Sunflower sea stars are a candidate species; stocks or DPS have not been identified.

7.3 Essential Fish Habitat Assessment

7.3.1 Background

The Magnuson–Stevens Fishery Conservation and Management Act, commonly referred to as the Magnuson–Stevens Act (MSA), is legislation that stipulates the management of marine fisheries in U.S. waters. Subpart J of 50 CFR 600 (50 CFR 600.805-815) provides guidelines for fishery management councils and agencies to satisfy EFH consultation requirements under Section 305(b(2)-(4)) of the MSA. Subpart J includes procedures for adding the required EFH provisions to an FMP and actions to conserve and enhance EFH.

EFH is defined as:

> *Those waters and substrates necessary to fish for spawning, breeding, feeding, or growth to maturity" (Delong and Collie 2004) and (50 CFR 600.10). "For the purpose of interpreting this definition of EFH: 'Waters' include aquatic areas (marine waters, intertidal habitats, and freshwater streams) and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; 'substrate' includes sediment, hard bottom, structures underlying the waters, and associated biological communities; 'necessary' means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and 'spawning, breeding, feeding, or growth to maturity' covers a species' full life cycle (50 CFR 600.10).*

The Sustainable Fisheries Act of 1996 (Public Law 104-297) amended the MSA and required that an EFH description be provided in all federal FMPs and required that federal agencies consult with NMFS on all activities that may adversely affect EFH. Subpart K of 50 CFR 600 (50 CFR 600.905-930) outlines the agency requirements for EFH coordination, consultation, and recommendations. As stated in 50 CFR 600.920(e)(1):

> *For any Federal action that may adversely affect EFH, Federal agencies must provide NMFS with a written assessment of the effects of that action on EFH.*

And under 50 CFR 600.920(e)(2):

> *The level of detail in an EFH Assessment should be commensurate with the complexity and magnitude of the potential adverse effects of the action.*

This section of the BE has been prepared to help the EPA satisfy these requirements.

7.3.2 EFH Analyzed for Consultation

The North Pacific Fishery Management Council (NPFMC) is responsible for fisheries off the coasts of Alaska and has developed five specific FMPs:

- Bering Sea and Aleutian Island Groundfish
- Gulf of Alaska Groundfish
- Bering Sea and Aleutian Island King and Tanner Crab
- Alaska Scallops
- Salmon Fisheries in the EEZ Off Alaska

EFH must be identified and described in an applicable FMP. Under 50 CFR 600.805:

> *An EFH provision in an FMP must include all fish species in the fishery management unit (FMU). An FMP may describe, identify, and protect the habitat of species not in an FMU; however, such habitat may not be considered EFH for the purposes of sections 303(a)(7) and 305(b) of the Magnuson-Stevens Act.*

As promulgated under 50 CFR 6008.15(a)(8):

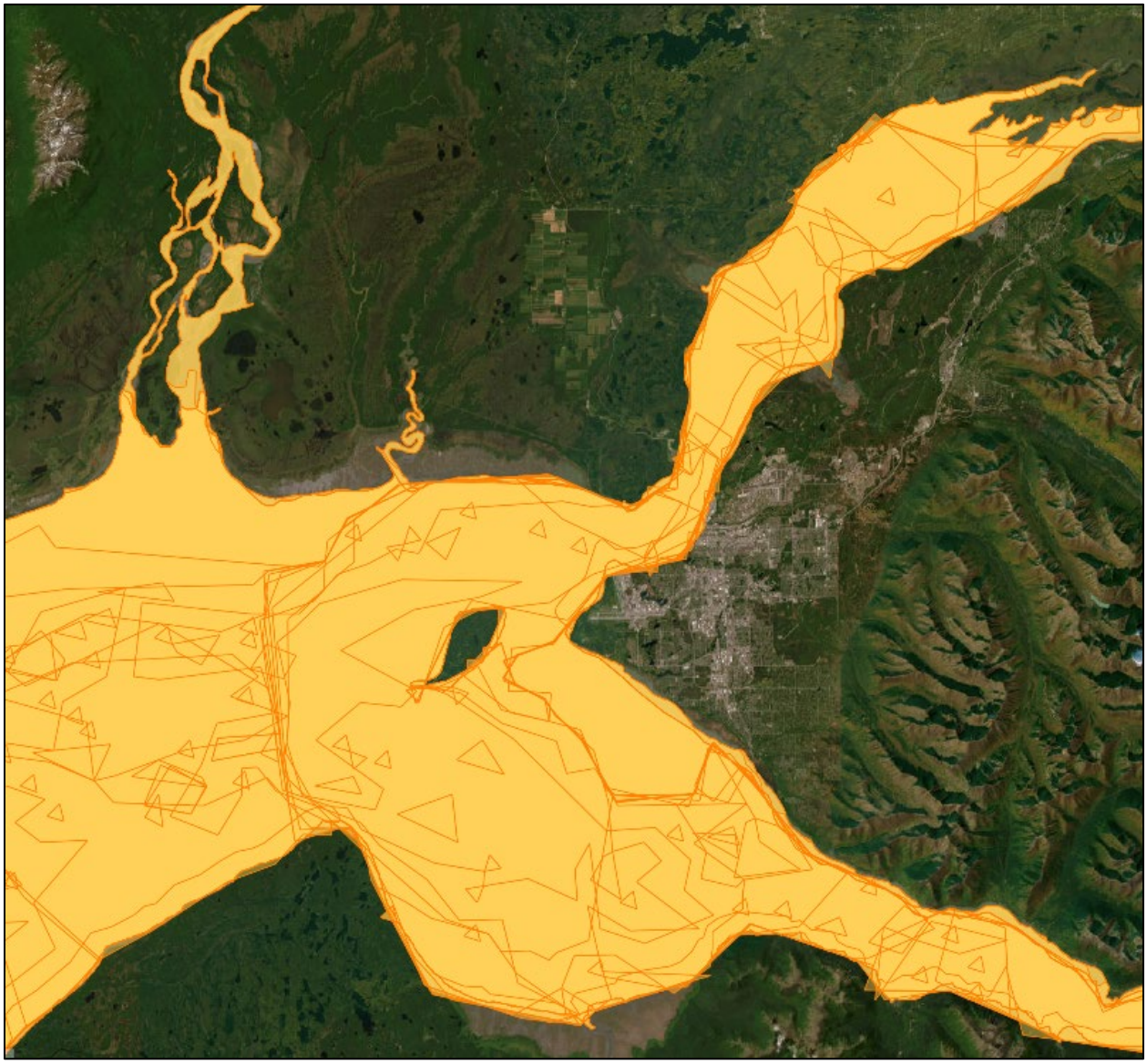
> *FMPs also should identify specific types or areas of habitat within EFH as habitat areas of particular concern (HAPC) based on one or more of the following considerations:*
>
> *(i) The importance of the ecological function provided by the habitat.*
>
> *(ii) The extent to which the habitat is sensitive to human-induced environmental degradation.*
>
> *(iii) Whether, and to what extent, development activities are, or will be, stressing the habitat type.*
>
> *(iv) The rarity of the habitat type*."

For this assessment, the presence of EFH and HAPCs in the action area was determined using the EFH Habitat Mapper for the North Pacific.[71]

Figure 7-1 depicts the output from the mapper for EFH in upper Cook Inlet in the vicinity of the action area and beyond; the yellow areas on the map are EFH as identified using the mapper. No HAPCs were identified by the mapper in upper Cook Inlet. **Table 7-1** shows the species for which EFH has been designated in upper Cook inlet and the vicinity of the action area at Point Woronzof, the life stages found at the location, and the specific FMP and its most recent amendment that addresses the species and EFH shown. The mapping tool confirmed that EFH for only two of the potential five specific FMPs for the North Pacific Region (Alaska Stocks of Pacific Salmon and Gulf of Alaska Groundfish) are found in the action area and upper Cook Inlet. As shown in **Table 7-1**, only eggs and larvae EFH are identified in upper Cook Inlet for nine groundfish species. However, marine stages mature and immature adults and juveniles are identified for Pacific salmon species.

[71] https://www.habitat.noaa.gov/apps/efhmapper/?page=page_2 Accessed March 25, 2024

Figure 7-1. EFH Identified for the Action Area



Source: https://www.habitat.noaa.gov/apps/efhmapper/?page=page_2. Accessed March 25, 2024.

Table 7-1. EFH Details for the Action Area

Species	Life Stages at the Location	FMP
Chinook salmon *Oncorhynchus tshawytscha*	Marine immature adult	Amendment 13 to the Salmon FMP (NPFMC 2018a)
Chum salmon *O. keta*	Marine immature adult Marine juvenile Marine mature adult	
Coho salmon *O. kisutch*	Marine juvenile Marine mature adult	
Sockeye salmon *O. nerka*	Marine immature adult Marine juvenile Marine mature adult	
Pink salmon *O. gorbuscha*	Marine juvenile Marine mature adult	
Alaska plaice *Pleuronectes quadrituberculatus*	Egg (summer) Larvae (summer)	Amendment 105 to Gulf of Alaska Groundfish FMP (NPFMC 2018b)
Dover sole *Microstomus pacificus*	Larvae (summer)	
Flathead Sole *Hippoglossoides elassodon*	Egg (summer) Larvae (summer)	
Northern rock sole *Lepidopsetta polyxystra*	Larvae (summer)	
Southern rock sole *L. bilineata*	Larvae (summer)	
Pacific cod *Gadus microcephalus*	Larvae (summer)	
Walleye pollock *G. chalcogrammus*	Larvae (summer)	
Yellowfin sole *Limanda aspera*	Egg (summer)	

Source: https://www.habitat.noaa.gov/apps/efhmapper/?page=page_2. Accessed March 25, 2024.

One Chinook salmon and five Pacific cod were captured and released at a beach seining location 1,200 meters east of the outfall as part of the 2022 field sampling in support of this permit renewal application (Kinnetic Environmental Inc. 2023b). The 2022 field effort also collected a total of 10 Pacific cod from two locations and one coho salmon from one of these locations, both of which are located across the inlet from the outfall near Point MacKenzie (Kinnetic Environmental Inc. 2023b). **Section 2.3** provides details on the numbers and species of fish caught and the locations of their catch during this and subsequent field sampling efforts.

7.3.3 EFH Effects Analysis and Determination

7.3.3.1 Definitions and Terminology

50 CFR 500.810, describes the following terms for use in an EFH Assessment:

> ***Adverse Effect*** *– Means any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.*
>
> ***Ecosystem*** *- Means communities of organisms interacting with one another and with the chemical and physical factors making up their environment.*
>
> ***Habitat Areas of Particular Concern (HAPC)*** *- means those areas of EFH identified pursuant to § 600.815(a)(8).*
>
> ***Healthy Ecosystem*** *– Means an ecosystem where ecological productive capacity is maintained, diversity of the flora and fauna is preserved, and the ecosystem retains the ability to regulate itself. Such an ecosystem should be similar to comparable, undisturbed ecosystems with regard to standing crop, productivity, nutrient dynamics, trophic structure, species richness, stability, resilience, contamination levels, and the frequency of diseased organisms.*
>
> ***Overfished*** *– Means any stock or stock complex, the status of which is reported as overfished by the Secretary pursuant to Section 304(e)(1) of the (MSA).*

7.3.3.2 EFH Assessment

Mandatory contents for an EFH assessment as promulgated under 50 CFR 600.920(3) are as follows:

(i) A description of the action (**Section 1**).

(ii) An analysis of the potential adverse effects of the action on EFH and the managed species (**Section 6**).

(iii) The conclusions regarding the effects of the action on EFH (**Section 6**).

(iv) Proposed mitigation, if applicable (**Section 6**).

7.3.4 Analysis of Potential Adverse Effects on EFH

The components of the AWPCF that could potentially affect EFH for salmon and groundfish within the action area are as follows:

- Physical structure; the outfall diffuser at the end of the discharge pipe
- Physical force of the effluent flowing from the diffuser
- Water quality within and at the edge of the ZID

7.3.4.1 Physical Structure

Details and diagrams of the physical structure of the outfall and diffuser are provided in **Section 2.4** The diffuser is situated at the end of the outfall located approximately 244 meters offshore of Point Woronzof. It is approximately 2.1 meters in diameter and rises approximately 6 meters from the sea floor. Depending on tidal stage, the diffuser structure could lie anywhere from 3.7 to 12.5 meters below the water surface. The diffuser structure has no moving parts that could entrain and potentially injure the eggs, larvae, or marine juvenile or adult fish identified in **Table 7-1**. The outfall and diffuser footprints are minimal in relation to available benthic habitat in and near the action area. Therefore, there are no adverse effects from the presence of the physical structure of the outfall and diffuser on either the salmon or groundfish EFH.

7.3.4.2 Physical Force

The physical force of the effluent flowing from the diffuser will not affect EFH within the action area. As described in **Section 4.1**, tidal amplitudes in upper Cook Inlet in the vicinity of the outfall are high and create strong currents. Based on the *2022 Mixing Zone Study*, effluent flow rate from the AWPCF outfall diffuser ranges from 34.9 to 41.4 mgd, depending on time of measurements (Jacobs 2023). Ambient currents at that location ranged from 0.59 to 1.92 meters per second, again depending on the time of measurements (Jacobs 2023). Based on strong currents and high silt load, the action is characterized by low benthic and water column primary productivity and low to moderate densities of epibenthic and pelagic organisms. Although the entire action area is mapped as EFH for salmon and groundfish, it is unlikely that good habitat to support these species is available in the immediate vicinity of the diffuser. The additional physical force generated from flow from the diffuser over a short distance will not adversely affect salmon or groundfish EFH.

7.3.4.3 Water Quality

As described in **Section 6.2** , there is a potential for fish species in upper Cook Inlet to experience concentration-based effects of exposure to ammonia, metals, pesticides, PFAS, SVOCs/PAHs, and one antihypertensive pharmaceutical in the immediate vicinity of the outfall. However, as described (Jacobs 2024), mixing and dilution of the effluent occurs rapidly within approximately 350 meters (refer to **Section 2.4** and **Figure 2-4**); therefore, actual exposure concentrations for any fish species outside of a few meters from the outfall are much lower than those directly at the end of the pipe. Concentrations at the end of the pipe are not considered ecologically meaningful because dilution occurs rapidly, species do not remain directly adjacent to the pipe for long periods of time, and no effects are expected at the edge of the ZID. For example, copper had the highest risk estimate of the metals evaluated but mixing zone modeling results predicted that the dilution of copper from reasonable maximum concentrations to below effect levels would occur within 25 meters off the outfall. Exposure of EFH species to contaminants within the 350-meter ZID for the duration required for toxic effects to occur is not likely.

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Appendix A
AWPCF Monitoring Program Results for 2022-2024

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A.1 Introduction

AWWU performs extensive sampling and analysis routinely to conform to their NPDES requirements. They conducted additional sampling and analysis in the effluent and receiving water as well as fish tissue during 2022 through 2024 in support of this BE and the NPDES permit renewal.

The results for the AWPCF 2022 to 2024 Monitoring Programs are summarized in this Appendix (see also Section 1.4 for additional background). Additional details can be found in the annual monitoring reports, the resource permit completion reports, and the 2022 and 2023 QAPPs (Kinnetic Environmental Inc. 2023b, a, 2024a, c).

The AWPCF's existing annual receiving water monitoring program includes hydrographic vertical profiles of temperature, salinity, pH, and dissolved oxygen along with discrete sample collections for turbidity, color, total residual chlorine, and fecal coliform at all sample locations. In addition, they include annual samples for total recoverable and dissolved metals, polycyclic aromatic hydrocarbons, total aromatic hydrocarbons (benzene, ethylbenzene, toluene, and xylenes), and cyanide obtained at three outfall locations and three control site locations in the receiving water during the beginning of the flood tide a low slack water that represented worst-case low water and low-flow conditions.

The additional analyses in years 2022 through 2024 in support of this BE and their NPDES permit renewal included:

- A full suite of volatile and semi-volatile organics, organochlorine pesticides (POCs), organophosphorus pesticides (POPs), polychlorinated biphenyls (PCBs), and dioxins sampled once in 2022 and twice in 2023.
- A suite of contaminants of emerging concern (CECs) were sampled and analyzed in 2023. These CECs were identified based on previous work by AWWU as well as previous studies performed in Puget Sound and Cook Inlet by NOAA). The CEC suite includes various "forever chemicals" such as PFAS, which are per- and poly-fluoroalkyl substances, and personal care products, select hormones, 6PPD-Quinone, and various other constituents that have been identified as pollutants of interest.
- Benthic infauna community surveys were conducted in 2022 and 2023.
- Fish tissue analysis performed in 2024.

A.2 2022 Monitoring Results

The 2022 monitoring program consisted of two main components:

- In-plant monitoring of influent, effluent, and sludge, including WET testing; and
- Receiving water quality monitoring and a benthic infauna survey in the vicinity of the discharge and mixing zone, and within Knik Arm.

To fulfill these components in 2022, AWWU conducted daily, weekly, or monthly sampling of influent, effluent, and sludge consistent with permit requirements. In addition, monitoring for toxic pollutants and pesticides was conducted, once in June 2022 and again in August 2022. WET testing was conducted quarterly and monitoring of receiving water quality was completed in June (Kinnetic Environmental Inc. 2023a).

A.2.1 Influent, Effluent, and Sludge

Results of the 2022 influent, effluent, and sludge monitoring showed that with one exception the AWPCF met the NPDES permit requirements. The exception occurred in November of 2022 when the percent removal for BOD_5 was found to be 24%, which is lower than the NPDES permit requirement of 30% removal. TRC, pH, fecal coliform, and TSS levels were all in compliance with permit limitations. Overall fecal coliform concentrations in the effluent were low and permit requirements were not exceeded. Average annual removals were 76% for TSS and 36% for BOD_5, indicating that high levels of primary treatment were achieved (Kinnetic Environmental Inc. 2023a).

As calculated from AWQS and the mixing zone dilution credits, TAH and TAqH in AWPCF effluent during 2022 were below their stipulated maximum allowable effluent concentrations (MAECs). During 2022 monitoring events, concentrations of metals, cyanide, and total ammonia in the effluent did not at any time exceed MAECs (Kinnetic Environmental Inc. 2023a). Concentrations of toxic pollutants, pesticides, metals, and cyanide in the influent and effluent samples were all within the established range or lower than values from a national study of secondary treatment plants (EPA 1982). Toxic pollutant concentrations in sewage sludge from AWPCF were found to be very low compared to the limits established by 40 CFR Part 503. Metals in the sludge metals were determined to be similar in range to, or lower than, values from a national study of secondary treatment plants; all metals in AWPCF sludge were well below the 95th percentile worst-case values in that study (EPA 1985a).

A.2.2 Receiving Water Quality.

As described in Kinnetic Environmental Inc. (2023a) only minor variations among stations were observed for the majority of hydrographic parameters indicating that the receiving water body is uniform and well mixed near the outfall. Statistical comparisons were made to test the hypothesis that water quality is not degraded at near-field stations as compared to control stations. Differences noted in water characteristics between near-field and control stations (e.g., temperature, salinity, pH, and turbidity) were attributed to riverine influences and higher current flows at the control stations.

Fecal coliform in receiving water and intertidal samples met the most restrictive AWQS criteria; this was also true at sampling locations located within the proposed 350-m mixing zone boundary. Supplemental receiving water samples obtained as part of the plume monitoring indicated total metals were elevated compared to dissolved metals due to the naturally high suspended sediment load in Cook Inlet. Dissolved metals were generally higher than those seen historically at all locations but these higher concentrations were attributed to inadequate field filtration due to high sediment loads. No statistically significant differences between the outfall and control station groupings were seen for any dissolved or total recoverable metals.

TAH and TAqH concentrations in receiving water samples met the AWQS at all locations and concentrations at control and outfall stations were not statistically different. Receiving water samples tested for cyanide met AWQS at all locations with the exception of one sample taken within the ZID directly over the outfall diffuser. TRC was detected in one receiving water sample; the sample was collected directly over the outfall at low slack tide. All other TRC concentrations were <10 μg/L. For comparison the marine AWQS is 7.5 μg/L for chronic effects, 13.0 μg/L for acute effects, and ADEC's Practical Quantitation Limit is 100 μg/L. The maximum concentration of TRC at the ZID boundary was estimated to be 5.0 μg/L. Turbidity did not exceed natural conditions and color did not exceed 5 color units at any receiving water station other the station located over the diffuser sampled at low slack tide.

A.2.3 Benthic Infauna Survey

During the fall of 2022, KEI collected fish using a beach seine at five intertidal sites, with three replicate seines performed at each site; a total of 147 specimens were collected (Table 6-2) (Kinnetic Environmental Inc. 2023b). Sample locations occupied in 2022 included: IT-2 and IT-8 located on the shoreline east of Point Woronzof; IT-9 west of Point Woronzof; and IT-C and IT-C4, located on the shoreline across the inlet from the outfall, to the west and east of Point MacKenzie, respectively. Figure 3-3 of the 2023 QAPP (Jacobs Engineering Group and Kinnetic Environmental Inc. 2023) provides a map of sample locations.

Table A-1. Beach Seine Sampling Results 2022

Station[1]	Rep	Date	Longfin Smelt	Pacific Cod	Staghorn Sculpin	Other Sculpin	Three-Spine Stickle-back	Coho Salmon	Chinook Salmon	Spot Shrimp
IT-2	1	9/20	24	2	-	1	1	-	-	8
	2	9/20	20	3	-	-	-	-	1	9
	3	9/20	7	-	2	-	-	-	-	8
IT-8	1	9/20	5	-	-	-	-	-	-	2
	2	9/20	8	-	2	-	-	-	-	6
	3	9/20	1	-	-	-	-	-	-	-
IT-9	1	9/20	3	-	-	-	-	-	-	-
	2	9/20	1	-	-	-	-	-	-	3
	3	9/20	3	-	-	-	-	-	-	-
IT-C	1	9/28	-	1	-	-	-	-	-	2
	2	9/28	2	1	-	-	-	-	-	3
	3	9/28	2	3	-	-	-	-	-	4
IT-C4	1	9/28	-	1	-	-	-	-	-	-
	2	9/28	-	1	-	-	-	2	-	-
	3	9/28	2	3	-	-	-	-	-	-
Total			78	15	4	1	1	2	1	45

Source: Kinnetic Environmental Inc. (2023b)

[1]Map of sample locations can be found in Jacobs Engineering Group and Kinnetic Environmental Inc. (2023)

As described in Kinnetic Environmental Inc. (2023b), in 2022 longfin smelt was the only reasonably abundant fish species collected; this species was observed in the majority of the replicate seine efforts (see Table 6-2). All but two fish specimens and one spot shrimp were released live after sampling; the three mortalities were kept for identification/reference purposes.

Additionally in 2022, six replicate intertidal sediment cores for analysis of benthic infauna were collected at each of six stations using a manual hand-corer. The samples were collected at the five beach seine locations shown in Table 6-2 plus at station IT-1, located to the east of station IT-2 (Jacobs Engineering Group and Kinnetic Environmental Inc. 2023, Kinnetic Environmental Inc. 2023b). During sediment

collection and sieving for eventual processing, bivalves (likely *Macoma spp*.) and polychaetes (likely a common Phyllodocid species) were observed and recorded. The results of infaunal sampling collected near the ZID boundary and at control stations near Pt. MacKenzie are summarized in Section 4.3.2 of this BE.

A.3 2023 Monitoring Results

The AWPCF 2023 monitoring program consisted of everything in the 2022 program with the addition of CEC's sampled in the effluent and receiving water. During 2023, two influent, effluent, and sludge toxic pollutant and pesticide sampling and analysis efforts, a receiving water quality sampling and analysis effort, and quarterly whole effluent WET testing were conducted (Kinnetic Environmental Inc. 2024a).

A.3.1 Influent and Effluent Monitoring

In 2023, influent, effluent, and sludge monitoring samples all met the NPDES permit requirements with no exceptions (Kinnetic Environmental Inc. 2024a). TRC, pH, fecal coliform, BOD_5 and TSS were all within permit limits. Fecal coliform concentrations in effluent samples were minimal; the permitted limit of 850 FC/100 mL as a monthly maximum geometric mean was never exceeded in 2023. Effluent concentrations of TSS and BOD_5 were well below the daily, weekly, and monthly permit limits for the entire year. Average annual removals were 75% for TSS and 38% for BOD_5, indicating a high level of primary treatment was achieved (Kinnetic Environmental Inc. 2024a).

During 2023, TAH and TAqH in effluent samples were below MAECs as calculated from AWQS using the facility's mixing zone dilution credit. Concentrations of metals, cyanide, and total ammonia in the effluent did not exceed MAECs at any time during 2023 (Kinnetic Environmental Inc. 2024a). Concentrations of toxic pollutants and pesticides, including metals and cyanide, in the influent and effluent samples were all within established ranges or were lower than values from a national study of secondary treatment plants (EPA 1982).

The concentrations of toxic pollutants in AWPCF sludge were very low compared to the limits established by 40 CFR Part 503. Metal concentrations in the sludge were similar in range to or lower than values from a national study of secondary treatment plants; all metals well below the 95th percentile worst-case values (EPA 1985b).

The CEC's analytical results are summarized in Table A-2. These CEC's were analyzed both in the effluent and the receiving water.

Table A-2. CEC Analysis - Receiving Water, Effluent & Creek Inputs (Conc. ng/L)

	Effluent	Outfall	ZID	ZID	Nearfield	Control - Pt MacKenzie			Chester Creek	Fish Creek	Ship Creek	Postmark Dr Storm Outfall
		F1-1	F1-2	F1-2 Dup	F1-3	C1-1	C1-2	C1-3				
6PPD-Quinone												
6PPD-Quinone	5.3	UB	92.8	-	UB	UB	UB	UB	7.74	6.51	UB	10
Alkylphenols												
4-n-Octylphenol	-	-	-	-	-	-	-	-	-	-	-	-
4-Nonylphenol diethoxylates	1470	398	-	-	-	-	-	-	-	-	-	-
4-Nonylphenol monoethoxylates	10300	1600	-	-	-	-	-	-	-	-	-	-
4-Nonylphenols	5670	561	-	-	-	-	-	-	105	28.2	-	224
Bisphenols												
Bisphenol A	1290	300	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB
Bisphenol AF	-	-	-	-	-	-	-	-	-	-	-	-
Bisphenol B	-	-	-	-	-	-	-	-	-	-	-	-
Bisphenol E	-	-	-	-	-	-	-	-	-	-	10.4	-
Bisphenol F	-	-	-	-	-	-	-	-	-	-	-	-
Bisphenol S	888	88.6	-	-	-	-	-	-	-	-	-	14.5
HBCDD												
alpha-HBCDD	-	-	-	-	-	-	-	-	-	-	-	-
beta-HBCDD	-	-	-	-	-	-	-	-	-	-	-	-
gamma-HBCDD	-	-	-	-	-	-	-	-	-	-	-	-
PFAS												
11Cl-PF3OUdS	-	-	-	-	-	-	-	-	-	-	-	-
3:3 FTCA	-	-	-	-	-	-	-	-	-	-	-	7.09
4:2 FTS	-	-	-	-	-	-	-	-	-	-	-	2.07 J
5:3 FTCA	59.2 J	-	-	-	-	-	-	-	-	-	-	146
6:2 FTS	UB	-	-	-	-	-	-	-	-	UB	UB	880
7:3 FTCA	-	-	-	-	-	-	-	-	-	-	-	-
8:2 FTS	-	-	-	-	-	-	-	-	-	-	-	35.4
9Cl-PF3ONS	-	-	-	-	-	-	-	-	-	-	-	-
ADONA	-	-	-	-	-	-	-	-	-	-	-	-
EtFOSAA	-	-	-	-	-	-	-	-	-	-	-	-
HFPO-DA	-	-	-	-	-	-	-	-	-	-	-	-
MeFOSAA	-	-	-	-	-	-	-	-	-	-	-	-
N-EtFOSA	-	-	-	-	-	-	-	-	-	-	-	-

	Effluent	Outfall	ZID	ZID	Nearfield	Control - Pt MacKenzie			Chester Creek	Fish Creek	Ship Creek	Postmark Dr Storm Outfall
		F1-1	F1-2	F1-2 Dup	F1-3	C1-1	C1-2	C1-3				
N-EtFOSE	-	-	-	-	-	-	-	-	-	-	-	-
NFDHA	-	-	-	-	-	-	-	-	-	-	-	-
N-MeFOSA	-	UB	-	-	-	-	-	-	-	-	-	-
N-MeFOSE	-	-	-	-	-	-	-	-	-	-	-	-
PFBA	14.9 J	-	-	-	-	-	-	-	2.21 J	8.49	-	101
PFBS	16.6 RJ	0.675 J	-	-	-	-	-	-	2.74	6.44	1.25 J	46.2
PFDA	-	-	-	-	-	-	-	-	-	1.48 J	-	7.94
PFDoA	-	-	-	-	-	-	-	-	-	-	-	1.12 J
PFDoS	-	-	-	-	-	-	-	-	-	-	-	-
PFDS	-	-	-	-	-	-	-	-	-	-	-	-
PFEESA	-	-	-	-	-	-	-	-	-	-	-	-
PFHpA	7.21	0.489 J	-	-	-	-	-	-	1.21 J	6.75	1.52 J	159
PFHpS	3.29 RJ	-	-	-	-	-	-	-	-	0.504 J	0.486 J	25.3
PFHxA	25.5	1.28 J	-	-	-	-	-	-	3.24	20	5.08	351
PFHxS	25.5	1.40 J	-	-	-	-	-	-	4.41	15.7	9.89	343
PFMBA	-	-	-	-	-	-	-	-	-	-	-	-
PFMPA	-	-	-	-	-	-	-	-	-	-	-	-
PFNA	2.68 J	-	-	-	-	-	-	-	-	9.3	-	28.9
PFNS	-	-	-	-	-	-	-	-	-	-	-	-
PFOA	18.5	1.09 J	-	-	-	-	-	-	2.98	16.1	5.38	131
PFOS	65.3	4.45	-	-	0.589 J	-	-	-	7.62	32.2	15.1	874
PFOSA	-	-	-	-	-	-	-	-	0.486 J	0.542 J	-	-
PFPeA	20.3	1.0 J	-	-	-	-	-	-	3.92	19.2	5.47	326
PFPeS	3.84 J	-	-	-	-	-	-	-	0.569 J	2.12	1.4 J	61.3
PFTeDA	-	-	-	-	-	-	-	-	-	-	-	-
PFTrDA	-	-	-	-	-	-	-	-	-	-	-	1.84
PFUnA	-	-	-	-	-	-	-	-	-	2.96	-	3.7
PFOA + PFOS	83.8	5.54	0	0	0.589	0	0	0	10.6	48.3	20.48	1005
Total PFAS	262.8	10.4	0	0	0.589	0	0	0	29.4	141.8	45.58	3532
PPCPs												
Hormones - ESI Negative												
17 alpha-Dihydroequilin	-	-	-	-	-	-	-	-	-	-	-	-
17 alpha-Estradiol	-	-	7.84	-	8.82	7.99	8.31	7.91	-	-	8.79	10.9 RJ
17 alpha-Ethinyl-Estradiol	-	-	-	-	-	-	-	-	-	-	-	-

	Effluent	Outfall	ZID	ZID	Nearfield	Control - Pt MacKenzie			Chester Creek	Fish Creek	Ship Creek	Postmark Dr Storm Outfall
		F1-1	F1-2	F1-2 Dup	F1-3	C1-1	C1-2	C1-3				
17 beta-Estradiol	5.52	-	-	-	-	-	-	-	-	-	-	-
Equilenin	13.4	-	-	-	-	-	-	-	-	-	-	-
Equilin	-	-	-	-	-	-	-	-	-	-	-	-
Estriol	-	12.8	-	-	-	-	-	-	-	-	-	-
Estrone	33.1	3.46 RJ	-	-	-	-	-	-	-	-	-	-
Hormones - ESI Positive												
17 beta-Estradiol 3-benzoate	-	-	-	-	-	-	-	-	-	-	-	-
Allyl Trenbolone	-	-	-	-	-	-	-	-	-	-	-	-
Androstenedione	162	10.9	-	-	-	-	-	-	-	-	-	-
Androsterone	57.1	39.1	-	-	-	-	-	-	-	-	-	-
Desogestrel	-	-	-	-	-	-	-	-	-	-	-	-
Mestranol	-	-	-	-	-	-	-	-	-	-	-	-
Norethindrone	-	-	-	-	-	-	-	-	-	-	-	-
Norgestrel	81.8	4.08	-	-	-	-	-	-	-	-	-	-
Progesterone	56.6	2.33	-	-	-	-	-	-	-	-	-	-
Testosterone	71.7	3.85	-	-	-	-	-	-	-	-	-	-
List 1 - Acid Extraction in Positive Ionization												
1,7-Dimethylxanthine	16200	1180	17.3	9.8	9.47	-	-	-	-	-	-	7.14
Acetaminophen	67500	6830	66.4	20.3	19.1	-	-	-	6.13	5.55	-	52.4
Azithromycin	341	4.02	-	-	-	-	-	-	-	-	-	-
Caffeine	45100	3620	48.8	29	26.3	6.29	6.4	10.9	152	29.4	6.74	252
Carbadox	-	-	-	-	-	-	-	-	-	-	-	-
Carbamazepine	112	9.17	-	-	-	-	-	-	-	-	-	-
Cefotaxime	-	-	-	-	-	-	-	-	-	-	-	-
Ciprofloxacin	102	3.84	-	-	2.17	1.78	1.87	-	-	-	-	-
Clarithromycin	40.7	2.89	-	-	-	-	-	-	-	-	-	-
Clinafloxacin	-	-	-	-	-	-	-	-	-	-	-	-
Cloxacillin	-	-	-	-	-	-	-	-	-	-	-	-
Dehydronifedipine	1.4	-	-	-	-	-	-	-	-	-	-	-
Digoxigenin	-	-	-	-	-	-	-	-	-	-	-	-
Digoxin	-	-	-	-	-	-	-	-	-	-	-	-
Diltiazem	96.1	7.19	-	-	-	-	-	-	-	-	-	-
Diphenhydramine	593	17.6	-	-	-	-	-	-	-	-	-	-
Enrofloxacin	0.708	-	-	-	-	-	-	-	-	-	-	-

	Effluent	Outfall	ZID	ZID	Nearfield	Control - Pt MacKenzie			Chester Creek	Fish Creek	Ship Creek	Postmark Dr Storm Outfall
		F1-1	F1-2	F1-2 Dup	F1-3	C1-1	C1-2	C1-3				
Erythromycin-H2O	12 J	-	-	-	-	-	-	-	-	-	-	-
Flumequine	-	-	-	-	-	-	-	-	-	-	-	-
Fluoxetine	28.6	1.46	-	-	-	-	-	-	-	-	-	-
Lincomycin	4.36	-	-	-	-	-	-	-	-	-	-	-
Lomefloxacin	-	-	-	-	-	-	-	-	-	-	-	-
Miconazole	1.97	-	-	-	-	-	-	-	-	-	-	-
Norfloxacin	-	-	-	-	-	-	-	-	-	-	-	-
Norgestimate	-	-	-	-	-	-	-	-	-	-	-	-
Ofloxacin	87.9	2.39	-	-	-	-	-	-	0.873	-	-	-
Ormetoprim	-	-	-	-	-	-	-	-	-	-	-	-
Oxacillin	-	-	-	-	-	-	-	-	-	-	-	-
Oxolinic Acid	-	-	-	-	-	-	-	-	-	-	-	-
Penicillin G	-	-	-	-	-	-	-	UB	UB	-	UB	-
Penicillin V	-	-	-	-	-	-	-	-	-	-	-	-
Roxithromycin	0.941	-	-	-	-	-	-	-	-	-	-	-
Sarafloxacin	-	-	-	-	-	-	-	-	-	-	-	-
Sulfachloropyridazine	-	-	-	-	-	-	-	-	-	-	-	-
Sulfadiazine	1.46	-	-	-	-	-	-	-	-	-	-	-
Sulfadimethoxine	-	-	-	-	-	-	-	-	-	-	-	-
Sulfamerazine	-	-	-	-	-	-	-	-	-	-	-	-
Sulfamethazine	-	-	-	-	-	-	-	-	-	-	-	-
Sulfamethizole	-	-	-	-	-	-	-	-	-	-	-	-
Sulfamethoxazole	416	33.7	0.656	-	-	-	-	-	-	-	-	-
Sulfanilamide	32.3	-	-	-	-	-	-	-	-	-	-	-
Sulfathiazole	-	-	-	-	-	-	-	-	-	-	-	-
Thiabendazole	30.6	0.828	-	-	-	-	-	-	-	-	-	-
Trimethoprim	294	23.4	0.323	-	-	-	-	-	-	0.329	-	-
Tylosin	1.43	-	-	-	-	-	-	-	-	-	-	-
Virginiamycin M1	-	-	-	-	-	-	-	-	-	-	-	-
List 3 - Acid Extraction in Negative Ionization												
2-Hydroxy-ibuprofen	-	1680	28.5	16.5	9.47	-	-	-	5.99	11.4	-	31.4
Bisphenol A	1590	219	-	-	-	-	-	-	-	-	-	-
Furosemide	202	15.7	-	-	-	-	-	-	-	-	-	-
Gemfibrozil	183	23	-	-	-	-	-	-	-	-	-	-

	Effluent	Outfall	ZID	ZID	Nearfield	Control - Pt MacKenzie			Chester Creek	Fish Creek	Ship Creek	Postmark Dr Storm Outfall
		F1-1	F1-2	F1-2 Dup	F1-3	C1-1	C1-2	C1-3				
Glipizide	4.58	-	-	-	-	-	-	-	-	-	-	-
Glyburide	-	-	-	-	-	-	-	-	-	-	-	-
Hydrochlorothiazide	1070	73.9	-	-	-	-	-	-	-	-	-	-
Ibuprofen	8150	906	16.1	9	8.16	-	-	-	-	3.89	-	8.9
Naproxen	6250	499	9.17	6.54	3.57	-	-	-	-	3.51	-	-
Triclocarban	4.89	-	-	-	-	-	-	-	-	-	-	-
Triclosan	-	-	-	-	-	-	-	-	-	-	-	-
Warfarin	-	-	-	-	-	-	-	-	-	-	-	-
List 4 - Basic Extraction in Postitive Ionization												
Albuterol	14.5	0.765	-	-	-	-	-	-	-	-	-	-
Amphetamine	539	35.1	0.748	-	0.448	-	-	-	0.617	-	0.521	-
Atenolol	381	24.4	0.638	0.303	-	-	-	-	-	-	-	-
Atorvastatin	220	5.32	-	-	-	-	-	-	-	-	-	-
Cimetidine	-	-	-	-	-	-	-	-	-	-	-	-
Clonidine	-	-	-	-	-	-	-	-	-	-	-	-
Codeine	58.3	2.9	-	-	-	-	-	-	-	-	-	-
Cotinine	2100	113	3.05	1.81	1.47	0.576	0.769	0.688	5.76	7.86	-	12
Enalapril	5.95	0.331	-	-	-	-	-	-	-	-	-	-
Hydrocodone	25.9	1.71	-	-	-	-	-	-	-	-	-	-
Metformin	45900	3710	97.6	55.5	42	UB	UB	UB	UB	UB	UB	UB
Oxycodone	55.9	3.68	-	-	-	-	-	-	-	-	-	-
Ranitidine	-	-	-	-	-	-	-	-	-	-	-	-
Triamterene	34.9	0.52	-	-	-	-	-	-	-	-	-	-
List 5 - Acid Extraction in Positive Ionization												
10-hydroxy-amitriptyline	11.3	0.858	-	-	-	-	-	-	-	-	-	-
Alprazolam	0.871	-	-	-	-	-	-	-	-	-	-	-
Amitriptyline	29.4	1.81	-	-	-	-	-	-	-	-	-	-
Amlodipine	18.8	1.21	-	-	-	-	-	-	-	-	-	-
Benzoylecgonine	1920	151	2.91	1.94	1.28	0.437	0.549	0.404	1.38	0.749	-	0.424
Benztropine	-	-	-	-	-	-	-	-	-	-	-	-
Betamethasone	-	-	-	-	-	-	-	-	-	-	-	-
Cocaine	568	42.5	0.576	0.284	0.219	-	-	-	0.621	0.438	-	0.375
DEET	6360	452	12.9	8.88	7.74	UB	UB	UB	39.6	27	UB	30.5
Desmethyldiltiazem	30.2	2.3	-	-	-	-	-	-	-	-	-	-

	Effluent	Outfall	ZID	ZID	Nearfield	Control - Pt MacKenzie			Chester Creek	Fish Creek	Ship Creek	Postmark Dr Storm Outfall
		F1-1	F1-2	F1-2 Dup	F1-3	C1-1	C1-2	C1-3				
Diazepam	0.827	-	-	-	-	-	-	-	-	-	-	-
Fluocinonide	-	-	-	-	-	-	-	-	-	-	-	-
Fluticasone propionate	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocortisone	207	12.7	-	-	-	-	-	-	-	-	-	-
Meprobamate	16.8	1.85	-	-	-	-	-	-	-	3.46	-	-
Methylprednisolone	-	-	-	-	-	-	-	-	-	-	-	-
Metoprolol	489	37	0.605	-	-	-	-	-	-	-	-	-
Norfluoxetine	7.89	1.02	-	-	-	-	-	-	-	-	-	-
Norverapamil	5.95	-	-	-	-	-	-	-	-	-	-	-
Paroxetine	3.52	-	-	-	-	-	-	-	-	-	-	-
Prednisolone	9.31	-	-	-	-	-	-	-	-	-	-	-
Prednisone	7.29	-	-	-	-	-	-	-	-	-	-	-
Promethazine	33.5	3.26	-	-	-	-	-	-	-	-	-	-
Propoxyphene	-	-	-	-	-	-	-	-	-	-	-	-
Propranolol	74.8	4.21	-	-	-	-	-	-	-	-	-	-
Sertraline	48.3	8.13	-	-	-	-	-	-	-	-	-	-
Simvastatin	-	-	-	-	-	-	-	-	-	-	-	-
Theophylline	48400 J	3900	45	25.3	22.4	-	-	-	16.3	16.6	-	38.6
Trenbolone	-	-	-	-	-	-	-	-	-	-	-	-
Trenbolone acetate	-	-	-	-	-	-	-	-	-	-	-	-
Valsartan	2480	141	-	-	-	-	-	-	-	-	-	-
Verapamil	10.3	0.158	-	-	-	-	-	-	-	-	-	-

Notes:

J Estimated concentration

RJ Peak detected but did not meet quantification criteria, reported concentration is estimated

- Not detected

UB Requalified to not detected due to elevated levels seen in the method blank(s)

A.3.2 Receiving Water Quality

As was found in 2022, there was minimal variation among stations for most hydrographic parameters indicating that the receiving water environment is uniform and well mixed near the outfall (Kinnetic Environmental Inc. 2024a). Statistical comparisons between data from near-field and control stations showed that water quality at the ZID boundary was not degraded. The analysis noted that differences in DO, pH, salinity, and temperature could not be ascribed AWPCF effluent but were likely due to higher riverine influences at the control stations.

Fecal coliform levels in receiving water and in intertidal sediment samples were low at all locations including those stations located within the proposed 350-m mixing zone boundary. In all cases the most restrictive AWQS criteria were met. Water samples collected as part of plume monitoring indicated that total metals concentrations were elevated compared to dissolved metals; this is likely due to the naturally high suspended sediment load in Cook Inlet. Statistically significant differences between the near-field and control station groupings were not found for any dissolved or total recoverable metals. One anomalously high dissolved copper concentration that exceeded AWQS was detected in a far-field sample collected outside of the ZID; however, the elevated concentration was determined to have likely been caused by a laboratory filtration issue.

Additional receiving water samples demonstrated that TAH and TAqH met the AWQS at all locations; no statistically significant differences were observed between the near-field and control stations. Cyanide in receiving water samples met AWQS at all locations with the exception of one sample taken within the ZID directly over the outfall where a dilution credit is allowed.

TRC was detected at only one receiving water location situated directly over the outfall at low slack tide. TRC in samples from all other locations were <10 µg/L. Based on the highest daily effluent TRC concentration of 808 µg/L and a 180:1 dilution credit, the maximum TRC at the ZID boundary was estimated to be 4.5 µg/L, meeting AWQS. Turbidity did not exceed natural conditions and color did not exceed 5 color units at any receiving water stations other than at a station within the ZID at low slack tide.

A.3.3 Benthic Infauna Survey

Fish collection took place during summer using a beach seine at five intertidal sites (IT) and using a mid-water trawl at two subtidal sites (ST) (Kinnetic Environmental Inc. 2024c). As described for the 2022 sampling effort, IT-2 and IT-8 are located on the shoreline east of Point Woronzof, IT-9 is situated west of Point Woronzof, and IT-C and IT-C4 are located on the shoreline across the inlet from the outfall. Subtidal site ST-1 is located offshore of IT-8 to the east of the outfall diffuser and subtidal site ST-C is located across the inlet near Point MacKenzie. Figure 3-3 of the 2023 QAPP (Jacobs Engineering Group and Kinnetic Environmental Inc. 2023) provides a map of sample locations. Table 6-3 depicts catch information by station for the 2023 sample effort. Table 2 of Kinnetic Environmental Inc. (2024c) provides details of the catch by station including species caught, count, length, life stage, and fate of each fish caught.

Table A-3. Beach Seine and Mid-Water Trawl Sampling Results 2023

Station[1]	Rep	Date	Longfin Smelt	Three-Spine Stickle-back	Pink Salmon	Larval Salmon2	Juvenile Fish3	Spot Shrimp	Misc. Amphipods
IT-2	1	7/28	-	5	-	-	-	-	-
	2	7/28	3	20	-	-	-	2	-
	3	7/28	-	8	-	-	-	1	-
IT-8	1	7/28	-	7	-	-	-	-	-
	2	7/28	-	4	-	-	-	-	-
	3	7/28	-	6	-	-	-	-	-
IT-9	1	7/28	-	3	-	-	-	-	-
	2	7/28	1	6	-	-	-	5	-
	3	7/28	2	5	-	-	-	2	-
IT-C	1	7/28	2	6	-	-	-	3	-
	2	7/28	1	5	-	1	-	6	-
	3	7/28	-	3	-	-	-	-	-
IT-C4	1	7/28	2	-	-	-	-	-	-
	2	7/28	-	1	-	-	-	1	-
	3	7/28	5	1	1	-	-	-	-
ST-1	1	8/2	-	18	-	-	-	8	33
	2	8/2	-	38	-	-	-	13	46
	3	8/2	-	22	1	-	-	18	35
ST-C	1	8/2	-	126	-	-	-	14	39
	2	8/2	-	167	2	-	1	14	67
	3	8/2	-	2	-	-	-	12	20
Total			**16**	**453**	**4**	**1**	**1**	**99**	**240**

Source: Kinnetic Environmental Inc. (2024c).

[1]Map of sample locations can be found in Jacobs Engineering Group and Kinnetic Environmental Inc. (2023)

[2]Species not determined.

[3]Species not determined, possible herring family.

A.4 2024 Fish Tissue Sampling Results

Fish tissue sampling was conducted in September 2022 and July 2023 using a mid-water trawl and beach seine as described in the *Phase II Quality Assurance Project Plan, 301(h) Waiver and NPDES Permit Renewal Application Supplement, for Asplund Water Pollution Control Facility* (2023).

Sampling sites are listed in Table A-4. Fish tissues were analyzed for priority pollutants and EPOCs following methods utilized by NMFS during a 2017 water quality and fish tissue study in upper Cook Inlet (Gill 2017). Analytical results are summarized in Tables A-5 and A-6.

Table A-4. Fish Sampling Stations 2024

Station No.	Station Depth	Station Location
IT-2	Intertidal	1,200 m east of Outfall
IT-C	Intertidal	North on Point MacKenzie side, across from diffuser (Control)
IT-8	Intertidal	Intertidal in eastern nearshore area within ZID boundary
IT-9	Intertidal	Intertidal in western nearshore area within ZID boundary
IT-C4	Intertidal	North of Pt. MacKenzie at historic IC4 site
Ship Creek*	Creek	Mouth of Ship Creek
Twentymile River	Creek	Mouth of Twentymile River

*ADF&G Emergency Order 2-SS-2-56-24 closed the Ship Creek sport fishing for all species through September 30, 2024. This prevented sample collection at Ship Creek.

Table A-5. 2024 Priority Pollutant Fish Tissue Sampling Results

Species	Eulachon					Pacific Cod					3-Spine Stickleback					S.Shrimp
Station	IT-2	IT-8	IT-C4	Twentymile R.		IT-2	IT-8	IT-9	IT-C	IT-C4	IT-2	IT-8	IT-9	IT-C	IT-C4	IT-C
Replicate	Rep 1	Rep 1	Rep 1	Rep 1	Rep 2	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1
Metals																
Antimony (mg/Kg)	0.007 J	-	-	-	0.003 J	0.004 J	0.0048 J	0.0138	0.004 J	0.0051 J	-	-	-	-	0.014 J	0.0054 J
Arsenic (mg/Kg)	0.93	1.13	1.28	1.00	1.08	7.12	9.25	5.52	5.22	8.91	1.32	1.27	1.37	1.29	1.41	3.67
Beryllium (mg/Kg)	0.0017 J	-	-	-	-	0.0009 J	-	-	0.0023 J	0.0024 J	-	-	-	0.0018 J	-	0.0062
Cadmium (mg/Kg)	0.0218	0.0309	0.0191	0.0184	0.0327	0.0341	0.0246	0.0419	0.0259	0.0483	0.0653	0.0678	0.0654	0.055	0.0519	0.747
Chromium (mg/Kg)	0.148	0.189	0.102	0.025 J	0.057	0.301	0.313	0.15	0.387	0.399	0.444	0.193	0.235	0.884	0.304	0.867
Copper (mg/Kg)	1.53	1.13	0.949	1.01	0.954	0.947	0.917	0.899	1.03	1.26	1.78	1.69	1.74	1.78	2.27	19.7
Lead (mg/Kg)	0.0218	0.0083	0.0082	0.0015 J	0.0034 J	0.0198	0.0192	0.014	0.036	0.0469	0.0105	0.0122	0.0148	0.0312	0.0375	0.0812
Mercury (µg/Kg)	3.28	3.89	3.52	2.80	3.37	24.9	37.5	26.5	14.3	34.4	38.3	46.5	44.9	42.2	38.2	25.6
Methyl Mercury (µg/Kg)	2.20	2.70	4.70	1.90	3.50	21.2	24.3	21.5	16.7	22.7	38.9	41.7	37.8	43.7	39	13.9
Molybdenum (mg/Kg)	0.007 J	-	-	-	-	0.015 J	0.014 J	0.015 J	0.013 J	0.021	0.025 J	0.024 J	0.024 J	0.028	0.020 J	0.052
Nickel (mg/Kg)	0.152	0.097	0.057	0.018 J	0.028 J	0.236	0.223	0.195	0.274	0.34	0.221	0.118	0.145	0.434	0.226	0.575
Selenium (mg/Kg)	0.19 J	0.19 J	0.16 J	0.18 J	0.18 J	0.90	0.84	0.80	0.64	0.96	0.83	0.84	0.99	0.83	0.84	0.46
Silver (mg/Kg)	0.0054	0.005	0.0026 J	0.0032 J	0.0036 J	0.0351	0.019	0.0289	0.0314	0.0484	0.0459	0.0518	0.0431	0.0318	0.0299	0.246
Thallium (mg/Kg)	0.0013 J	0.0006 J	-	-	-	0.0023 J	0.0017 J	0.0022 J	0.0026 J	0.0027 J	0.0037 J	0.0029 J	0.0032 J	0.0037 J	0.0033 J	0.0036 J
Zinc (mg/Kg)	14.3	13.3	12.4	12	13.3	14.5	15.5	16.2	12.9	15.2	48.3	48.3	50.9	48.3	43.2	10.8
Dioxins (ng/Kg)																
2,3,7,8-TCDD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	NT	-
PCBs (µg/Kg)																
Aroclor 1254	-	-	3.4	-	-	-	-	-	-	-	4.6	3.7	4.1	-	4.9	-
Aroclor 1260	-	-	5.8	-	-	-	-	-	-	-	-	-	2.9	-	4.1	-
Pesticides (µg/Kg)																
alpha-Chlordane	-	-	-	-	-	-	-	-	-	-	7.7	8.8	9.2	9.6	15	-
Mirex	-	-	-	-	-	-	2.0	-	-	-	-	-	-	-	-	-
Phenols (µg/Kg)																
2,4,6-Trichlorophenol	29 J	9.2 J	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Nitrophenol	98	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	200	45	-	-	-	-	-	-	-	-	-	-	-	-	-	110
Polycyclic Aromatic Hydrocarbons (µg/Kg)																
All 16 Analytes	-	-	-	-	-	-	-	-	NT	-	-	-	-	-	NT	-

Species	Eulachon					Pacific Cod					3-Spine Stickleback					S.Shrimp
Station	IT-2	IT-8	IT-C4	Twentymile R.		IT-2	IT-8	IT-9	IT-C	IT-C4	IT-2	IT-8	IT-9	IT-C	IT-C4	IT-C
Replicate	Rep 1	Rep 1	Rep 1	Rep 1	Rep 2	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1
SVOCs Other (µg/Kg)																
Bis(2-ethylhexyl) Phthalate	-	-	-	-	-	-	-	-	-	-	910 J	780 J	800 J	850 J	840 J	-
Di-n-octyl Phthalate	-	-	-	-	-	UB	190 J+	150 J+	UB	240 J+	UB	UB	-	UB	-	-
Nitrobenzene	-	-	-	-	-	-	-	-	-	-	-	7.6 J	12 J	-	34 J	-
N-Nitrosodimethylamine	320 J	-	85 J	100 J	140 J	50 J	37 J	53 J	36 J	-	19 J	19 J	18 J	17 J	19 J	81 J
Moisture (%)																
Moisture	79.2	79.8	76.0	78.2	78.6	81.4	81.6	81.0	81.8	80.9	71.8	72.5	71.2	72.4	68.2	81.1
Solids (%)																
Solids, Total	20.8	20.2	24.0	21.8	21.4	18.6	18.4	19.0	18.2	19.1	28.2	27.5	28.8	27.6	31.8	18.9

Notes:

J Estimated concentration below the MRL

J+ Estimated concentration biased high due to elevated level seen in method blank

NT Not tested due to insufficient tissue biomass

UB Requalified to not detected due to elevated levels seen in the method blank

- Not detected

Table A-6. 2024 Emerging Pollutants of Concern (EPOCs) Fish Tissue Sampling Results

Species	Pacific Cod					Three-spine Stickleback				
Station	IT-2	IT-8	IT-9	IT-C	IT-C4	IT-2	IT-8	IT-9	IT-C	IT-C4
Replicate	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1
AlkylPhenols										
4-n-Octylphenol (OP)	-	-	-	-	-	-	-	-	-	NT
4-Nonylphenol (NP)	-	-	-	-	-	-	-	-	-	NT
4-Nonylphenol diethoxylate	-	-	-	-	-	-	-	-	-	NT
4-Nonylphenol monoethoxylate	-	-	-	-	-	-	-	-	-	NT
Bisphenols										
Bisphenol A	-	-	-	-	-	-	-	-	-	-
HBCDD										
alpha-HBCDD	-	-	NT	-	-	-	-	-	-	NT
beta-HBCDD	-	-	NT	-	-	-	-	-	-	NT
gamma-HBCDD	-	-	NT	-	-	-	-	-	-	NT
PFAS										
11Cl-PF3OUdS	-	-	-	-	-	-	-	-	-	-
3:3 FTCA	-	-	-	-	-	-	-	-	-	-
4:2 FTS	-	-	-	-	-	-	-	-	-	-
5:3 FTCA	-	-	-	-	-	-	-	-	-	-
6:2 FTS	-	-	-	-	-	-	-	-	-	-
7:3 FTCA	-	-	-	-	-	-	-	-	-	-
8:2 FTS	-	-	-	-	-	-	-	-	-	-
9Cl-PF3ONS	-	-	-	-	-	-	-	-	-	-
ADONA	-	-	-	-	-	-	-	-	-	-
EtFOSAA	-	-	-	-	-	-	-	-	-	-
HFPO-DA	-	-	-	-	-	-	-	-	-	-
MeFOSAA	-	-	-	-	-	-	-	-	-	-
N-EtFOSA	-	-	-	-	-	-	-	-	-	-
N-EtFOSE	1.89 J	2.47 J	1.61 J	-	2.63 J	1.21 J	-	-	-	-
NFDHA	-	-	-	-	-	-	-	-	-	-
N-MeFOSA	-	-	-	-	-	-	-	-	-	-
N-MeFOSE	-	-	-	-	-	-	-	-	-	-
PFBA	-	-	-	-	-	-	-	-	-	-
PFBS	-	-	-	-	-	-	-	-	-	-
PFDA	0.131 J	0.118 J	-	-	-	0.162 J	0.146 J	0.142 J	0.123 J	-
PFDoA	-	-	-	-	-	0.111 J	0.0988 J	-	0.0999 RJ	-
PFDoS	-	-	-	-	-	-	-	-	-	-
PFDS	-	-	-	-	-	-	-	-	-	-
PFEESA	-	-	-	-	-	-	-	-	-	-
PFHpA	-	-	-	-	-	-	-	-	-	-
PFHpS	-	-	-	-	-	-	-	-	-	-
PFHxA	-	-	-	-	0.215 RJ	-	-	-	-	-
PFHxS	0.141 J	-	-	-	-	0.220 RJ	-	-	-	-
PFMBA	-	-	-	-	-	-	-	-	-	-
PFMPA	-	-	-	-	-	-	-	-	-	-
PFNA	0.963	0.831	0.759	0.375 J	0.524	0.592	0.651	0.546	0.319 J	0.328 J
PFNS	-	-	-	-	-	-	-	-	-	-
PFOA	0.225 J	0.185 J	0.183 J	-	0.127 J	0.165 J	-	0.146 RJ	-	0.119 J
PFOS	1.14	0.636	0.404	0.457	0.56	1.37	0.557	0.658	0.327 J	0.251 J
PFOSA	0.191 J	0.141 J	0.152 J	0.103 J	0.107 J	-	-	-	-	-
PFPeA	-	-	-	-	-	-	-	-	-	-

Species	Pacific Cod					Three-spine Stickleback				
Station	IT-2	IT-8	IT-9	IT-C	IT-C4	IT-2	IT-8	IT-9	IT-C	IT-C4
Replicate	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1
PFPeS	-	-	-	-	-	-	-	-	-	-
PFTeDA	-	-	-	-	-	-	-	-	-	-
PFTrDA	0.108 J	-	0.099 RJ	0.107 J	-	0.297 J	0.243 J	0.258 J	0.201 J	0.140 J
PFUnA	-	-	-	-	-	-	-	-	-	-
PFOA + PFOS	1.365	0.821	0.587	0.457	0.687	1.535	0.557	0.804	0.327	0.37
Total PFAS	4.789	4.381	3.207	1.042	4.163	4.127	1.6958	1.75	1.0699	0.838

Table 6. (Continued).

Species	Pacific Cod					Three-spine Stickleback				
Station	IT-2	IT-8	IT-9	IT-C	IT-C4	IT-2	IT-8	IT-9	IT-C	IT-C4
Replicate	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1
Pharmaceuticals and Personal Care Products (PPCPs)										
Hormones - ESI Negative										
17 alpha-Dihydroequilin	-	-	-	-	-	-	-	-	-	-
17 alpha-Estradiol	-	-	-	-	-	-	-	-	-	-
17 alpha-Ethinyl-Estradiol	-	-	-	-	-	-	-	-	-	-
17 beta-Estradiol	-	-	-	-	-	-	-	-	3.84	-
Equilenin	-	-	-	-	-	-	-	-	-	-
Equilin	-	-	-	-	-	-	-	-	-	-
Estriol	-	-	-	-	-	-	-	-	-	-
Estrone	-	-	-	-	-	-	-	-	-	-
Hormones - ESI Positive										
17 beta-Estradiol 3-benzoate	-	-	-	-	-	-	-	-	-	-
Allyl Trenbolone	-	-	-	-	-	-	-	-	-	-
Androstenedione	-	-	-	-	-	0.883	-	1.49	0.401	-
Androsterone	-	-	-	-	-	-	-	39.7	-	-
Desogestrel	-	-	-	-	-	-	-	-	-	-
Mestranol	-	-	-	-	-	-	-	-	-	-
Norethindrone	4.1	-	7.87	-	3.6	-	11.7	20.1	3.3	7.21
Norgestrel	-	-	-	-	-	-	-	-	-	-
Progesterone	-	-	-	-	-	-	-	-	-	-
Testosterone	0.191	-	0.312	-	-	2.46	-	3.23	0.79	-
List 1 - Acid Extraction in Positive Ionization										
1,7-Dimethylxanthine	-	-	-	-	-	-	-	-	-	-
Acetaminophen	-	-	-	-	-	-	-	-	-	-
Azithromycin	-	-	-	-	-	-	-	-	-	-
Caffeine	-	-	-	-	-	-	-	-	-	-
Carbadox	1.05	-	-	-	-	-	-	-	-	-
Carbamazepine	-	-	-	-	-	-	-	-	-	-
Cefotaxime	-	-	-	-	-	-	-	-	-	-
Ciprofloxacin	-	-	-	-	-	-	-	1.4	-	-
Clarithromycin	-	-	-	-	-	-	-	-	-	-
Clinafloxacin	-	-	-	-	-	-	-	-	-	-
Cloxacillin	-	-	-	-	-	-	-	-	-	-
Dehydronifedipine	-	-	-	-	-	-	-	-	-	-
Digoxigenin	-	-	-	-	-	-	-	-	-	-
Digoxin	-	-	-	-	-	-	-	-	-	-
Diltiazem	-	-	-	-	-	-	-	-	-	-
Diphenhydramine	-	-	-	-	-	-	-	-	-	-
Enrofloxacin	-	-	-	-	-	-	-	-	-	-
Erythromycin-H2O	-	-	-	-	-	-	-	-	-	-
Flumequine	-	-	-	-	-	-	-	-	-	-
Fluoxetine	-	-	-	-	-	-	-	-	-	-
Lincomycin	-	-	-	-	-	-	-	-	-	-
Lomefloxacin	-	-	-	-	-	-	-	-	-	-
Miconazole	-	-	-	-	-	-	-	-	-	-
Norfloxacin	-	-	-	-	-	-	-	-	-	-
Norgestimate	-	-	-	-	-	0.82	0.742	-	-	-
Ofloxacin	-	-	-	-	-	-	-	0.39	-	-
Ormetoprim	-	-	-	-	-	-	-	-	-	-

Table 6. (Continued).

Species	Pacific Cod					Three-spine Stickleback				
Station	IT-2	IT-8	IT-9	IT-C	IT-C4	IT-2	IT-8	IT-9	IT-C	IT-C4
Replicate	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1
List 1 - Acid Extraction in Positive Ionization (continued)										
Oxacillin	-	-	-	-	-	-	-	-	-	-
Oxolinic Acid	-	-	-	-	-	-	-	-	-	-
Penicillin G	-	-	-	-	-	-	-	-	-	-
Penicillin V	-	-	-	-	-	-	-	-	-	-
Roxithromycin	-	-	-	-	-	-	-	-	-	-
Sarafloxacin	-	-	-	-	-	-	-	-	-	-
Sulfachloropyridazine	-	-	-	-	-	-	-	-	-	-
Sulfadiazine	-	-	-	-	-	-	-	-	-	-
Sulfadimethoxine	-	-	-	-	-	-	-	-	-	-
Sulfamerazine	-	-	-	-	-	-	-	-	-	-
Sulfamethazine	-	-	-	-	-	-	-	-	-	-
Sulfamethizole	-	-	-	-	-	-	-	-	-	-
Sulfamethoxazole	-	-	-	-	-	-	-	-	-	-
Sulfanilamide	-	-	-	-	-	-	-	-	-	-
Sulfathiazole	-	-	-	-	-	-	-	-	-	-
Thiabendazole	-	-	-	-	-	-	-	-	-	-
Trimethoprim	-	-	-	-	-	-	-	-	-	-
Tylosin	-	-	-	-	-	-	-	-	-	-
Virginiamycin M1	-	-	-	-	-	-	-	-	-	0.312
List 3 - Acid Extraction in Negative Ionization										
2-Hydroxy-ibuprofen	-	-	-	1.89	-	1.84	2.32	4.12	1.59	2.9
Bisphenol A	-	-	-	7.85	-	-	-	-	-	-
Furosemide	-	-	-	-	-	-	-	-	-	-
Gemfibrozil	-	-	-	-	-	-	-	-	-	-
Glipizide	-	-	-	-	-	-	-	-	-	-
Glyburide	-	-	-	-	-	-	-	-	-	-
Hydrochlorothiazide	-	-	-	-	-	-	-	-	-	-
Ibuprofen	-	-	-	-	-	-	-	-	-	-
Naproxen	-	-	-	-	-	-	-	-	-	-
Triclocarban	-	-	-	-	-	-	-	-	-	-
Triclosan	-	-	-	-	-	-	-	-	-	-
Warfarin	-	-	-	-	-	-	-	-	-	-
List 4 - Basic Extraction in Positive Ionization										
Albuterol	-	-	-	-	-	-	-	-	-	-
Amphetamine	-	-	-	-	-	-	-	-	-	-
Atenolol	-	-	-	-	-	-	-	-	-	-
Atorvastatin	-	-	-	-	-	-	-	-	-	-
Cimetidine	-	-	-	-	-	-	-	-	-	-
Clonidine	-	-	-	-	-	-	-	-	-	-
Codeine	-	-	-	-	-	-	-	-	-	-
Cotinine	-	-	-	-	-	-	-	-	-	-
Enalapril	-	-	-	-	-	-	-	-	-	-
Hydrocodone	-	-	-	-	-	-	-	-	-	-
Metformin	-	-	-	-	-	-	-	-	-	-
Oxycodone	-	-	-	-	-	-	-	-	-	-
Ranitidine	-	-	-	-	-	-	-	-	-	-
Triamterene	-	-	-	-	-	-	-	-	-	-

Table 6. (Continued).

Species	Pacific Cod					Three-spine Stickleback				
Station	IT-2	IT-8	IT-9	IT-C	IT-C4	IT-2	IT-8	IT-9	IT-C	IT-C4
Replicate	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1
List 5 - Acid Extraction in Positive Ionization										
10-hydroxy-amitriptyline	-	-	-	-	-	-	-	-	-	-
Alprazolam	-	-	-	-	-	-	-	-	-	-
Amitriptyline	-	-	-	-	-	-	-	-	-	-
Amlodipine	-	-	-	-	-	-	-	-	-	-
Benzoylecgonine	-	-	-	-	-	-	-	-	-	-
Benztropine	-	-	-	-	-	-	-	-	-	-
Betamethasone	-	-	-	-	-	-	-	-	-	-
Cocaine	-	-	-	-	-	-	-	-	-	-
DEET	-	-	-	-	-	-	-	-	-	-
Desmethyldiltiazem	-	-	-	-	-	-	-	-	-	-
Diazepam	-	-	-	-	-	-	-	0.238	-	-
Fluocinonide	-	-	-	-	-	-	-	-	-	-
Fluticasone propionate	-	-	-	-	-	-	-	-	-	-
Hydrocortisone	3.49	-	5.24	-	-	66.3	35.4	51.7	59.1	64.2
Meprobamate	-	-	-	-	-	-	-	-	-	-
Methylprednisolone	6.81 R	-	-	-	-	-	-	-	-	-
Metoprolol	-	-	-	-	-	-	-	-	-	-
Norfluoxetine	-	-	-	-	-	-	-	-	-	-
Norverapamil	-	-	-	-	-	-	-	-	-	-
Paroxetine	-	-	-	-	-	-	-	-	-	-
Prednisolone	-	-	-	-	-	-	-	-	-	-
Prednisone	-	-	-	-	-	-	-	-	-	-
Promethazine	-	-	-	-	-	-	-	-	-	-
Propoxyphene	-	-	-	-	-	-	-	-	-	-
Propranolol	-	-	-	-	-	-	-	-	-	-
Sertraline	-	-	-	-	-	-	-	-	-	-
Simvastatin	-	-	-	-	-	-	-	-	-	-
Theophylline	-	-	-	-	79.1*	235*	-	-	-	-
Trenbolone	-	-	-	-	-	-	-	-	-	-
Trenbolone acetate	-	-	-	-	-	-	-	0.168	-	-
Valsartan	-	-	-	-	-	-	-	-	-	-
Verapamil	-	-	-	-	-	-	-	-	-	-
Other										
% Lipid	1.4	1.39	NT	1.32	1.56	3.62	4.08	4.49	1.67	NT
% Moisture	79.1	41.8	NT	NT	80.6	69.2	70.3	68.8	71.4	NT

Notes:

J Estimated concentration less than limit of quantification.

NT Not tested due to insufficient tissue biomass.

R Peak detected, did not meet quantification criteria, result should be interpreted as the maximum possible concentration.

\- Not detected

* Co-elutes with 1,7-Dimethylxanthine, maximum possible concentration is reported.

Table 6. (Continued).

Species	Eulachon (hooligan)						S. Shrimp	Starry Flounder	
Station	IT-2	IT-8	IT-C	IT-C4	Twentymile R.		IT-C	IT-9	IT-C
Replicate	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 2	Rep 1	Rep 1	Rep 1
AlkylPhenols									
4-n-Octylphenol (OP)	-	-	-	-	-	-	-	-	-
4-Nonylphenol (NP)	-	-	-	-	-	-	-	-	-
4-Nonylphenol diethoxylate	-	-	-	-	-	-	-	-	-
4-Nonylphenol monoethoxylate	-	-	-	-	-	-	-	-	-
Bisphenols									
Bisphenol A	-	-	-	-	1.28	-	-	-	-
HBCDD									
alpha-HBCDD	-	-	-	-	-	-	-	-	-
beta-HBCDD	-	-	-	-	-	-	-	-	-
gamma-HBCDD	-	-	-	-	-	-	-	-	-
PFAS									
11Cl-PF3OUdS	-	-	-	-	-	-	-	-	-
3:3 FTCA	-	-	-	-	-	-	-	-	-
4:2 FTS	-	-	-	-	-	-	-	-	-
5:3 FTCA	-	-	-	-	-	-	-	-	-
6:2 FTS	-	-	-	-	-	-	-	-	-
7:3 FTCA	-	-	-	-	-	-	-	-	-
8:2 FTS	-	-	-	-	-	-	-	-	-
9Cl-PF3ONS	-	-	-	-	-	-	-	-	-
ADONA	-	-	-	-	-	-	-	-	-
EtFOSAA	-	-	-	-	-	-	-	-	-
HFPO-DA	-	-	-	-	-	-	-	-	-
MeFOSAA	-	-	-	-	-	-	-	-	-
N-EtFOSA	-	-	-	-	-	-	-	-	-
N-EtFOSE	1.47 J	-	-	-	-	-	1.92 J	1.14 J	-
NFDHA	-	-	-	-	-	-	-	-	-
N-MeFOSA	-	-	-	-	-	-	-	-	-
N-MeFOSE	-	-	-	-	-	-	-	-	-
PFBA	-	-	-	-	-	-	-	-	-
PFBS	-	-	-	-	-	-	-	-	-
PFDA	-	-	-	0.121 J	0.125 J	-	0.245 J	-	-
PFDoA	-	0.104 RJ	-	-	0.125 RJ	-	-	0.113 J	-
PFDoS	-	-	-	-	-	-	-	-	-
PFDS	-	-	-	-	-	-	-	-	-
PFEESA	-	-	-	-	-	-	-	-	-
PFHpA	-	-	-	-	-	-	-	-	-
PFHpS	-	-	-	-	-	-	-	-	-
PFHxA	-	-	-	-	-	-	-	-	-
PFHxS	-	-	-	-	-	-	-	-	-
PFMBA	-	-	-	-	-	-	-	-	-
PFMPA	-	-	-	-	-	-	-	-	-
PFNA	-	-	-	-	-	-	1.06	1.62	3.56
PFNS	-	-	-	-	-	-	-	-	-
PFOA	-	-	-	-	-	-	-	0.141 J	-
PFOS	-	-	-	0.110 J	-	-	0.917	4.33	3.65
PFOSA	-	-	-	-	-	-	0.26 J	0.101 J	0.121 J
PFPeA	-	-	-	-	-	-	-	-	-
PFPeS	-	-	-	-	-	-	-	-	-
PFTeDA	-	-	-	-	-	-	-	-	-

Species	Eulachon (hooligan)						S. Shrimp	Starry Flounder	
Station	IT-2	IT-8	IT-C	IT-C4	Twentymile R.		IT-C	IT-9	IT-C
Replicate	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 2	Rep 1	Rep 1	Rep 1
PFTrDA	0.160 J	-	-	0.156 J	0.187 J	0.246 RJ	0.227 J	0.185 RJ	-
PFUnA	-	-	-	-	-	-	-	-	-
PFOA + PFOS	0	0	0	0.110 J	0	0	0.917	4.471	3.65
Total PFAS	1.63	0.104	0	0.387	0.437	0.246	4.629	7.63	7.331

Table 6. (Continued).

Species	Eulachon (hooligan)						S. Shrimp	Starry Flounder	
Station	IT-2	IT-8	IT-C	IT-C4	Twentymile R.		IT-C	IT-9	IT-C
Replicate	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 2	Rep 1	Rep 1	Rep 1
Pharmaceuticals and Personal Care Products (PPCPs)									
Hormones - ESI Negative									
17 alpha-Dihydroequilin	-	-	-	-	-	-	-	-	-
17 alpha-Estradiol	-	-	-	-	-	-	-	-	-
17 alpha-Ethinyl-Estradiol	-	-	-	-	-	-	-	-	-
17 beta-Estradiol	-	-	-	-	-	-	-	-	-
Equilenin	-	-	-	-	-	-	-	-	-
Equilin	-	-	-	-	-	-	-	-	-
Estriol	-	-	-	-	-	-	-	-	-
Estrone	-	-	-	-	-	-	-	-	-
Hormones - ESI Positive									
17 beta-Estradiol 3-benzoate	-	-	-	-	-	-	-	-	-
Allyl Trenbolone	-	-	-	-	-	-	-	-	-
Androstenedione	-	-	-	-	-	-	-	-	-
Androsterone	-	-	-	-	-	-	-	-	-
Desogestrel	-	-	-	-	-	-	-	-	-
Mestranol	-	-	-	-	-	-	-	-	-
Norethindrone	-	2.96	5.65	0.762	2.48	-	3.28	4.15	4.75
Norgestrel	-	-	-	-	-	-	-	-	-
Progesterone	-	-	-	-	-	-	-	1.15	1.96
Testosterone	-	-	-	-	-	0.204	-	-	-
List 1 - Acid Extraction in Positive Ionization									
1,7-Dimethylxanthine	-	-	-	-	-	-	-	-	-
Acetaminophen	-	-	-	-	-	-	-	-	-
Azithromycin	-	-	-	-	-	-	-	-	-
Caffeine	-	-	-	-	-	-	-	-	-
Carbadox	-	-	-	-	-	-	-	-	-
Carbamazepine	-	-	-	-	-	-	-	-	-
Cefotaxime	-	-	-	-	-	-	-	-	-
Ciprofloxacin	-	-	-	-	-	-	-	1.24	-
Clarithromycin	-	-	-	-	-	-	-	-	-
Clinafloxacin	-	-	-	-	-	-	-	-	-
Cloxacillin	-	-	-	-	-	-	-	-	-
Dehydronifedipine	-	-	-	-	-	-	-	-	-
Digoxigenin	-	-	-	-	-	-	-	-	-
Digoxin	-	-	-	-	-	-	-	-	-
Diltiazem	-	-	-	-	-	-	-	-	-
Diphenhydramine	-	-	-	-	-	-	-	-	-
Enrofloxacin	-	-	-	-	-	-	-	-	-
Erythromycin-H2O	-	-	-	-	-	-	-	-	-
Flumequine	-	-	-	-	-	-	-	-	-
Fluoxetine	-	-	-	-	-	-	-	-	-
Lincomycin	-	-	-	-	-	-	-	-	-
Lomefloxacin	-	-	-	-	-	-	-	-	-
Miconazole	-	-	-	-	-	-	-	-	-
Norfloxacin	-	-	-	-	-	-	-	-	-
Norgestimate	-	-	-	-	-	-	-	-	-
Ofloxacin	-	-	-	-	-	-	-	-	-
Ormetoprim	-	-	-	-	-	-	-	-	-

Table 6. (Continued).

Species	Eulachon (hooligan)						S. Shrimp	Starry Flounder	
Station	IT-2	IT-8	IT-C	IT-C4	Twentymile R.		IT-C	IT-9	IT-C
Replicate	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 2	Rep 1	Rep 1	Rep 1
List 1 - Acid Extraction in Positive Ionization (continued)									
Oxacillin	-	-	-	-	-	-	-	-	-
Oxolinic Acid	-	-	-	-	-	-	-	-	-
Penicillin G	-	-	-	-	-	-	-	-	-
Penicillin V	-	-	-	-	-	-	-	-	-
Roxithromycin	-	-	-	-	-	-	-	-	-
Sarafloxacin	-	-	-	-	-	-	-	-	-
Sulfachloropyridazine	-	-	-	-	-	-	-	-	-
Sulfadiazine	-	-	-	-	-	-	-	-	-
Sulfadimethoxine	-	-	-	-	-	-	-	-	-
Sulfamerazine	-	-	-	-	-	-	-	-	-
Sulfamethazine	-	-	-	-	-	-	-	-	-
Sulfamethizole	0.738	-	-	-	-	-	-	-	-
Sulfamethoxazole	-	-	-	-	-	-	-	-	-
Sulfanilamide	-	-	-	-	-	-	-	-	-
Sulfathiazole	-	-	-	-	-	-	-	-	-
Thiabendazole	-	-	-	-	-	-	-	-	-
Trimethoprim	-	-	-	-	-	-	-	-	-
Tylosin	-	-	-	-	-	-	-	-	-
Virginiamycin M1	-	-	-	-	0.239	-	-	-	0.355
List 3 - Acid Extraction in Negative Ionization									
2-Hydroxy-ibuprofen	-	-	-	-	-	-	-	-	-
Bisphenol A	-	-	-	-	-	-	-	-	-
Furosemide	-	-	-	-	-	-	-	-	-
Gemfibrozil	-	-	-	-	-	-	-	-	-
Glipizide	-	-	-	-	-	-	-	-	-
Glyburide	-	-	-	-	-	-	-	-	-
Hydrochlorothiazide	-	-	-	-	-	-	-	-	-
Ibuprofen	-	-	-	-	-	-	-	-	-
Naproxen	-	-	-	-	-	-	-	-	-
Triclocarban	-	-	-	-	-	-	-	-	-
Triclosan	-	-	-	-	12.6 R	7.27 R	-	-	-
Warfarin	-	-	-	-	-	-	-	-	-
List 4 - Basic Extraction in Positive Ionization									
Albuterol	-	-	-	-	-	-	-	-	-
Amphetamine	-	-	-	-	-	-	-	-	-
Atenolol	-	-	-	-	-	-	-	-	-
Atorvastatin	-	-	-	-	-	-	-	-	-
Cimetidine	-	-	-	-	-	-	-	-	-
Clonidine	-	-	-	-	-	-	-	-	-
Codeine	-	-	-	-	-	-	-	-	-
Cotinine	-	-	-	-	-	-	-	-	-
Enalapril	-	-	-	-	-	-	-	-	-
Hydrocodone	-	-	-	-	-	-	-	-	-
Metformin	-	-	-	-	-	-	-	-	-
Oxycodone	-	-	-	-	-	-	-	-	-
Ranitidine	-	-	-	-	-	-	-	-	-
Triamterene	-	-	-	-	-	-	-	-	-

Table 6. (Continued).

Species	Eulachon (hooligan)						S. Shrimp	Starry Flounder	
Station	IT-2	IT-8	IT-C	IT-C4	Twentymile R.		IT-C	IT-9	IT-C
Replicate	Rep 1	Rep 1	Rep 1	Rep 1	Rep 1	Rep 2	Rep 1	Rep 1	Rep 1
List 5 - Acid Extraction in Positive Ionization									
10-hydroxy-amitriptyline	-	-	-	-	-	-	0.0921	0.0658	-
Alprazolam	-	-	-	-	-	-	-	-	-
Amitriptyline	-	-	-	-	-	-	-	-	-
Amlodipine	-	-	-	-	-	-	-	-	-
Benzoylecgonine	-	-	-	-	-	-	-	-	-
Benztropine	-	-	-	-	-	-	-	-	-
Betamethasone	-	-	-	-	-	-	-	-	-
Cocaine	-	-	-	-	-	-	-	-	-
DEET	-	-	-	-	-	-	-	-	-
Desmethyldiltiazem	-	-	-	-	-	-	-	-	-
Diazepam	-	-	-	-	-	-	-	-	-
Fluocinonide	-	-	-	-	-	-	-	-	-
Fluticasone propionate	-	-	-	-	-	-	-	-	-
Hydrocortisone	442	11.7	6.28	700	98.1	86.7	-	109	80.9
Meprobamate	-	-	-	-	-	-	-	-	-
Methylprednisolone	-	-	-	-	-	-	-	5.47	-
Metoprolol	-	-	-	-	-	-	-	-	-
Norfluoxetine	-	-	-	-	-	-	-	-	-
Norverapamil	-	-	-	-	-	-	-	-	-
Paroxetine	-	-	-	-	-	-	-	-	-
Prednisolone	-	-	-	-	-	-	-	-	-
Prednisone	-	-	-	-	-	-	-	-	-
Promethazine	-	-	-	-	-	-	-	-	-
Propoxyphene	-	-	-	-	-	-	-	-	-
Propranolol	-	-	-	-	-	-	-	-	-
Sertraline	-	-	-	-	-	-	-	-	-
Simvastatin	-	-	-	-	-	-	-	-	-
Theophylline	63*	-	-	-	13.3*	-	-	-	-
Trenbolone	-	-	-	-	-	-	-	-	-
Trenbolone acetate	-	-	-	-	-	-	-	-	-
Valsartan	-	-	-	-	-	-	-	-	-
Verapamil	-	-	-	-	-	-	-	-	-
Other									
% Lipid	7.84	10.1	12.3	7.66	9.94	9.1	1.28	0.79	1.15
% Moisture	78.0	74.5	73.1	76.0	77.6	75.8	79.9	79.4	79.8

Notes:

J Estimated concentration less than limit of quantification.

NT Not tested due to insufficient tissue biomass.

R Peak detected, did not meet quantification criteria, result should be interpreted as the maximum possible concentration.

\- Not detected.

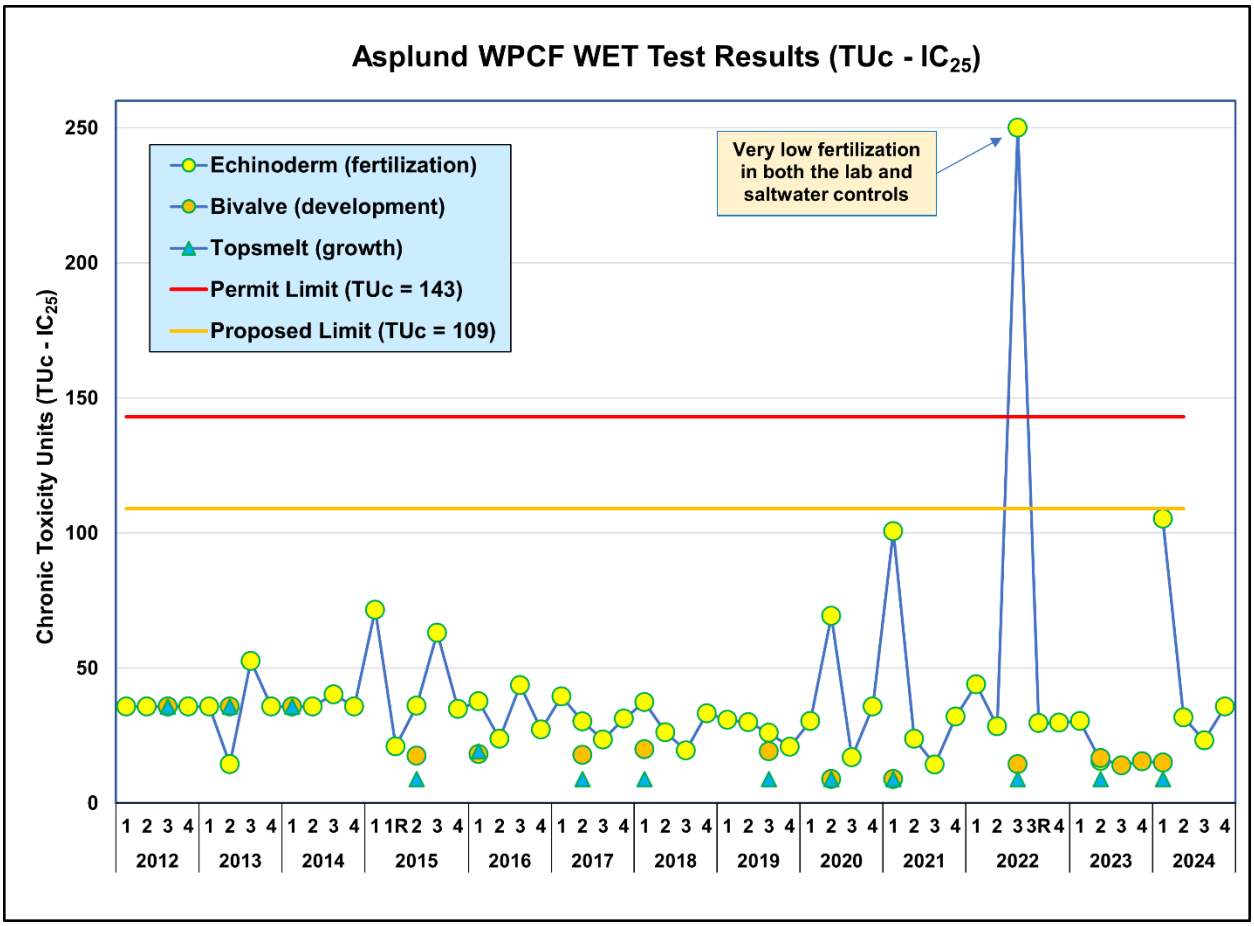
* Co-elutes with 1,7-Dimethylxanthine, maximum possible concentration is reported.

A.5 Whole Effluent Toxicity Testing

In 2022, with the exception of one urchin fertilization test conducted in the third quarter, results of quarterly WET testing met the permit limit, and all were below the permitted trigger level for all species and events. The third quarter urchin WET test was reperformed as required by the permit and returned acceptable results; the retest results were below the trigger limit. Additional details and the complete data set for influent, effluent and sludge sampling during the 2022 annual monitoring program can be found in Kinnetic Environmental Inc. (2023a) and the associated appendices.

Quarterly WET testing analyses results met permit limits and all were below the permitted trigger level for all species in 2023 (Kinnetic Environmental Inc. 2024a). Results from the period 2012 – 2024 for the WET testing are presented in Figure A-1.

Figure A-1. 2012 – 2024 WET Test Results for Echinoderm



CEC Analysis - Receiving Water, Effluent & Creek Inputs (Conc. ng/L)

	Effluent	Outfall	ZID	ZID	Nearfield	Control - Pt MacKenzie			Chester Creek	Fish Creek	Ship Creek	Postmark Dr Storm Outfall
		F1-1	F1-2	F1-2 Dup	F1-3	C1-1	C1-2	C1-3				
6PPD-Quinone												
6PPD-Quinone	5.3	UB	92.8	-	UB	UB	UB	UB	7.74	6.51	UB	10
Alkylphenols												
4-n-Octylphenol	-	-	-	-	-	-	-	-	-	-	-	-
4-Nonylphenol diethoxylates	1470	398	-	-	-	-	-	-	-	-	-	-
4-Nonylphenol monoethoxylates	10300	1600	-	-	-	-	-	-	-	-	-	-
4-Nonylphenols	5670	561	-	-	-	-	-	-	105	28.2	-	224
Bisphenols												
Bisphenol A	1290	300	UB	UB	UB	UB	UB	UB	UB	UB	UB	UB
Bisphenol AF	-	-	-	-	-	-	-	-	-	-	-	-
Bisphenol B	-	-	-	-	-	-	-	-	-	-	-	-
Bisphenol E	-	-	-	-	-	-	-	-	-	-	10.4	-
Bisphenol F	-	-	-	-	-	-	-	-	-	-	-	-
Bisphenol S	888	88.6	-	-	-	-	-	-	-	-	-	14.5
HBCDD												
alpha-HBCDD	-	-	-	-	-	-	-	-	-	-	-	-
beta-HBCDD	-	-	-	-	-	-	-	-	-	-	-	-
gamma-HBCDD	-	-	-	-	-	-	-	-	-	-	-	-
PFAS												
11Cl-PF3OUdS	-	-	-	-	-	-	-	-	-	-	-	-
3:3 FTCA	-	-	-	-	-	-	-	-	-	-	-	7.09
4:2 FTS	-	-	-	-	-	-	-	-	-	-	-	2.07 J
5:3 FTCA	59.2 J	-	-	-	-	-	-	-	-	-	-	146
6:2 FTS	UB	-	-	-	-	-	-	-	-	UB	UB	880
7:3 FTCA	-	-	-	-	-	-	-	-	-	-	-	-
8:2 FTS	-	-	-	-	-	-	-	-	-	-	-	35.4
9Cl-PF3ONS	-	-	-	-	-	-	-	-	-	-	-	-
ADONA	-	-	-	-	-	-	-	-	-	-	-	-
EtFOSAA	-	-	-	-	-	-	-	-	-	-	-	-
HFPO-DA	-	-	-	-	-	-	-	-	-	-	-	-
MeFOSAA	-	-	-	-	-	-	-	-	-	-	-	-
N-EtFOSA	-	-	-	-	-	-	-	-	-	-	-	-
N-EtFOSE	-	-	-	-	-	-	-	-	-	-	-	-
NFDHA	-	-	-	-	-	-	-	-	-	-	-	-
N-MeFOSA	-	UB	-	-	-	-	-	-	-	-	-	-
N-MeFOSE	-	-	-	-	-	-	-	-	-	-	-	-
PFBA	14.9 J	-	-	-	-	-	-	-	2.21 J	8.49	-	101
PFBS	16.6 RJ	0.675 J	-	-	-	-	-	-	2.74	6.44	1.25 J	46.2
PFDA	-	-	-	-	-	-	-	-	-	1.48 J	-	7.94
PFDoA	-	-	-	-	-	-	-	-	-	-	-	1.12 J
PFDoS	-	-	-	-	-	-	-	-	-	-	-	-
PFDS	-	-	-	-	-	-	-	-	-	-	-	-
PFEESA	-	-	-	-	-	-	-	-	-	-	-	-
PFHpA	7.21	0.489 J	-	-	-	-	-	-	1.21 J	6.75	1.52 J	159
PFHpS	3.29 RJ	-	-	-	-	-	-	-	-	0.504 J	0.486 J	25.3
PFHxA	25.5	1.28 J	-	-	-	-	-	-	3.24	20	5.08	351
PFHxS	25.5	1.40 J	-	-	-	-	-	-	4.41	15.7	9.89	343
PFMBA	-	-	-	-	-	-	-	-	-	-	-	-
PFMPA	-	-	-	-	-	-	-	-	-	-	-	-
PFNA	2.68 J	-	-	-	-	-	-	-	-	9.3	-	28.9
PFNS	-	-	-	-	-	-	-	-	-	-	-	-
PFOA	18.5	1.09 J	-	-	-	-	-	-	2.98	16.1	5.38	131
PFOS	65.3	4.45	-	-	0.589 J	-	-	-	7.62	32.2	15.1	874
PFOSA	-	-	-	-	-	-	-	-	0.486 J	0.542 J	-	-
PFPeA	20.3	1.0 J	-	-	-	-	-	-	3.92	19.2	5.47	326
PFPeS	3.84 J	-	-	-	-	-	-	-	0.569 J	2.12	1.4 J	61.3
PFTeDA	-	-	-	-	-	-	-	-	-	-	-	-
PFTrDA	-	-	-	-	-	-	-	-	-	-	-	1.84
PFUnA	-	-	-	-	-	-	-	-	-	2.96	-	3.7
PFOA + PFOS	83.8	5.54	0	0	0.589	0	0	0	10.6	48.3	20.48	1005
Total PFAS	262.8	10.4	0	0	0.589	0	0	0	29.4	141.8	45.58	3532

CEC Analysis - Receiving Water, Effluent & Creek Inputs (Conc. ng/L)

	Effluent	Outfall	ZID	ZID	Nearfield	Control - Pt MacKenzie			Chester Creek	Fish Creek	Ship Creek	Postmark Dr Storm Outfall
		F1-1	F1-2	F1-2 Dup	F1-3	C1-1	C1-2	C1-3				
PPCPs												
Hormones - ESI Negative												
17 alpha-Dihydroequilin	-	-	-	-	-	-	-	-	-	-	-	-
17 alpha-Estradiol	-	-	7.84	-	8.82	7.99	8.31	7.91	-	-	8.79	10.9 RJ
17 alpha-Ethinyl-Estradiol	-	-	-	-	-	-	-	-	-	-	-	-
17 beta-Estradiol	5.52	-	-	-	-	-	-	-	-	-	-	-
Equilenin	13.4	-	-	-	-	-	-	-	-	-	-	-
Equilin	-	-	-	-	-	-	-	-	-	-	-	-
Estriol	-	12.8	-	-	-	-	-	-	-	-	-	-
Estrone	33.1	3.46 RJ	-	-	-	-	-	-	-	-	-	-
Hormones - ESI Positive												
17 beta-Estradiol 3-benzoate	-	-	-	-	-	-	-	-	-	-	-	-
Allyl Trenbolone	-	-	-	-	-	-	-	-	-	-	-	-
Androstenedione	162	10.9	-	-	-	-	-	-	-	-	-	-
Androsterone	57.1	39.1	-	-	-	-	-	-	-	-	-	-
Desogestrel	-	-	-	-	-	-	-	-	-	-	-	-
Mestranol	-	-	-	-	-	-	-	-	-	-	-	-
Norethindrone	-	-	-	-	-	-	-	-	-	-	-	-
Norgestrel	81.8	4.08	-	-	-	-	-	-	-	-	-	-
Progesterone	56.6	2.33	-	-	-	-	-	-	-	-	-	-
Testosterone	71.7	3.85	-	-	-	-	-	-	-	-	-	-
List 1 - Acid Extraction in Positive Ionization												
1,7-Dimethylxanthine	16200	1180	17.3	9.8	9.47	-	-	-	-	-	-	7.14
Acetaminophen	67500	6830	66.4	20.3	19.1	-	-	-	6.13	5.55	-	52.4
Azithromycin	341	4.02	-	-	-	-	-	-	-	-	-	-
Caffeine	45100	3620	48.8	29	26.3	6.29	6.4	10.9	152	29.4	6.74	252
Carbadox	-	-	-	-	-	-	-	-	-	-	-	-
Carbamazepine	112	9.17	-	-	-	-	-	-	-	-	-	-
Cefotaxime	-	-	-	-	-	-	-	-	-	-	-	-
Ciprofloxacin	102	3.84	-	-	2.17	1.78	1.87	-	-	-	-	-
Clarithromycin	40.7	2.89	-	-	-	-	-	-	-	-	-	-
Clinafloxacin	-	-	-	-	-	-	-	-	-	-	-	-
Cloxacillin	-	-	-	-	-	-	-	-	-	-	-	-
Dehydronifedipine	1.4	-	-	-	-	-	-	-	-	-	-	-
Digoxigenin	-	-	-	-	-	-	-	-	-	-	-	-
Digoxin	-	-	-	-	-	-	-	-	-	-	-	-
Diltiazem	96.1	7.19	-	-	-	-	-	-	-	-	-	-
Diphenhydramine	593	17.6	-	-	-	-	-	-	-	-	-	-
Enrofloxacin	0.708	-	-	-	-	-	-	-	-	-	-	-
Erythromycin-H2O	12 J	-	-	-	-	-	-	-	-	-	-	-
Flumequine	-	-	-	-	-	-	-	-	-	-	-	-
Fluoxetine	28.6	1.46	-	-	-	-	-	-	-	-	-	-
Lincomycin	4.36	-	-	-	-	-	-	-	-	-	-	-
Lomefloxacin	-	-	-	-	-	-	-	-	-	-	-	-
Miconazole	1.97	-	-	-	-	-	-	-	-	-	-	-
Norfloxacin	-	-	-	-	-	-	-	-	-	-	-	-
Norgestimate	-	-	-	-	-	-	-	-	-	-	-	-
Ofloxacin	87.9	2.39	-	-	-	-	-	-	0.873	-	-	-
Ormetoprim	-	-	-	-	-	-	-	-	-	-	-	-
Oxacillin	-	-	-	-	-	-	-	-	-	-	-	-
Oxolinic Acid	-	-	-	-	-	-	-	-	-	-	-	-
Penicillin G	-	-	-	-	-	-	-	UB	UB	-	UB	-
Penicillin V	-	-	-	-	-	-	-	-	-	-	-	-
Roxithromycin	0.941	-	-	-	-	-	-	-	-	-	-	-
Sarafloxacin	-	-	-	-	-	-	-	-	-	-	-	-
Sulfachloropyridazine	-	-	-	-	-	-	-	-	-	-	-	-
Sulfadiazine	1.46	-	-	-	-	-	-	-	-	-	-	-
Sulfadimethoxine	-	-	-	-	-	-	-	-	-	-	-	-
Sulfamerazine	-	-	-	-	-	-	-	-	-	-	-	-
Sulfamethazine	-	-	-	-	-	-	-	-	-	-	-	-
Sulfamethizole	-	-	-	-	-	-	-	-	-	-	-	-
Sulfamethoxazole	416	33.7	0.656	-	-	-	-	-	-	-	-	-
Sulfanilamide	32.3	-	-	-	-	-	-	-	-	-	-	-
Sulfathiazole	-	-	-	-	-	-	-	-	-	-	-	-
Thiabendazole	30.6	0.828	-	-	-	-	-	-	-	-	-	-
Trimethoprim	294	23.4	0.323	-	-	-	-	-	-	0.329	-	-
Tylosin	1.43	-	-	-	-	-	-	-	-	-	-	-
Virginiamycin M1	-	-	-	-	-	-	-	-	-	-	-	-

CEC Analysis - Receiving Water, Effluent & Creek Inputs (Conc. ng/L)

	Effluent	Outfall	ZID	ZID	Nearfield	Control - Pt MacKenzie			Chester Creek	Fish Creek	Ship Creek	Postmark Dr Storm Outfall
		F1-1	F1-2	F1-2 Dup	F1-3	C1-1	C1-2	C1-3				
List 3 - Acid Extraction in Negative Ionization												
2-Hydroxy-ibuprofen	-	1680	28.5	16.5	9.47	-	-	-	5.99	11.4	-	31.4
Bisphenol A	1590	219	-	-	-	-	-	-	-	-	-	-
Furosemide	202	15.7	-	-	-	-	-	-	-	-	-	-
Gemfibrozil	183	23	-	-	-	-	-	-	-	-	-	-
Glipizide	4.58	-	-	-	-	-	-	-	-	-	-	-
Glyburide	-	-	-	-	-	-	-	-	-	-	-	-
Hydrochlorothiazide	1070	73.9	-	-	-	-	-	-	-	-	-	-
Ibuprofen	8150	906	16.1	9	8.16	-	-	-	-	3.89	-	8.9
Naproxen	6250	499	9.17	6.54	3.57	-	-	-	-	3.51	-	-
Triclocarban	4.89	-	-	-	-	-	-	-	-	-	-	-
Triclosan	-	-	-	-	-	-	-	-	-	-	-	-
Warfarin	-	-	-	-	-	-	-	-	-	-	-	-
List 4 - Basic Extraction in Postitive Ionization												
Albuterol	14.5	0.765	-	-	-	-	-	-	-	-	-	-
Amphetamine	539	35.1	0.748	-	0.448	-	-	-	0.617	-	0.521	-
Atenolol	381	24.4	0.638	0.303	-	-	-	-	-	-	-	-
Atorvastatin	220	5.32	-	-	-	-	-	-	-	-	-	-
Cimetidine	-	-	-	-	-	-	-	-	-	-	-	-
Clonidine	-	-	-	-	-	-	-	-	-	-	-	-
Codeine	58.3	2.9	-	-	-	-	-	-	-	-	-	-
Cotinine	2100	113	3.05	1.81	1.47	0.576	0.769	0.688	5.76	7.86	-	12
Enalapril	5.95	0.331	-	-	-	-	-	-	-	-	-	-
Hydrocodone	25.9	1.71	-	-	-	-	-	-	-	-	-	-
Metformin	45900	3710	97.6	55.5	42	UB	UB	UB	UB	UB	UB	UB
Oxycodone	55.9	3.68	-	-	-	-	-	-	-	-	-	-
Ranitidine	-	-	-	-	-	-	-	-	-	-	-	-
Triamterene	34.9	0.52	-	-	-	-	-	-	-	-	-	-
List 5 - Acid Extraction in Positive Ionization												
10-hydroxy-amitriptyline	11.3	0.858	-	-	-	-	-	-	-	-	-	-
Alprazolam	0.871	-	-	-	-	-	-	-	-	-	-	-
Amitriptyline	29.4	1.81	-	-	-	-	-	-	-	-	-	-
Amlodipine	18.8	1.21	-	-	-	-	-	-	-	-	-	-
Benzoylecgonine	1920	151	2.91	1.94	1.28	0.437	0.549	0.404	1.38	0.749	-	0.424
Benztropine	-	-	-	-	-	-	-	-	-	-	-	-
Betamethasone	-	-	-	-	-	-	-	-	-	-	-	-
Cocaine	568	42.5	0.576	0.284	0.219	-	-	-	0.621	0.438	-	0.375
DEET	6360	452	12.9	8.88	7.74	UB	UB	UB	39.6	27	UB	30.5
Desmethyldiltiazem	30.2	2.3	-	-	-	-	-	-	-	-	-	-
Diazepam	0.827	-	-	-	-	-	-	-	-	-	-	-
Fluocinonide	-	-	-	-	-	-	-	-	-	-	-	-
Fluticasone propionate	-	-	-	-	-	-	-	-	-	-	-	-
Hydrocortisone	207	12.7	-	-	-	-	-	-	-	-	-	-
Meprobamate	16.8	1.85	-	-	-	-	-	-	-	3.46	-	-
Methylprednisolone	-	-	-	-	-	-	-	-	-	-	-	-
Metoprolol	489	37	0.605	-	-	-	-	-	-	-	-	-
Norfluoxetine	7.89	1.02	-	-	-	-	-	-	-	-	-	-
Norverapamil	5.95	-	-	-	-	-	-	-	-	-	-	-
Paroxetine	3.52	-	-	-	-	-	-	-	-	-	-	-
Prednisolone	9.31	-	-	-	-	-	-	-	-	-	-	-
Prednisone	7.29	-	-	-	-	-	-	-	-	-	-	-
Promethazine	33.5	3.26	-	-	-	-	-	-	-	-	-	-
Propoxyphene	-	-	-	-	-	-	-	-	-	-	-	-
Propranolol	74.8	4.21	-	-	-	-	-	-	-	-	-	-
Sertraline	48.3	8.13	-	-	-	-	-	-	-	-	-	-
Simvastatin	-	-	-	-	-	-	-	-	-	-	-	-
Theophylline	48400 J	3900	45	25.3	22.4	-	-	-	16.3	16.6	-	38.6
Trenbolone	-	-	-	-	-	-	-	-	-	-	-	-
Trenbolone acetate	-	-	-	-	-	-	-	-	-	-	-	-
Valsartan	2480	141	-	-	-	-	-	-	-	-	-	-
Verapamil	10.3	0.158	-	-	-	-	-	-	-	-	-	-

Notes:

J Estimated concentration

RJ Peak detected but did not meet quantification criteria, reported concentration is estimated

- Not detected

UB Requalified to not detected due to elevated levels seen in the method blank(s)

Appendix B

Hydrodynamic Model Development and Calibration and Model Results

Prepared for
U.S. Environmental Protection Agency, Region 10

July 31, 2025

Jacobs

EC049

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Acronyms and Abbreviations

3D	three-dimensional
ADCP	acoustic Doppler current profiling
AWPCF	Asplund Water Pollution Control Facility
AWWU	Anchorage Water and Wastewater Utility
BC	boundary condition
BE	biological evaluation
CI	Cook Inlet
EFDC	Environmental Fluid Dynamics Code
EPA	U.S. Environmental Protection Agency Region 10
EPOC	emerging parameters of concern
mg/L	milligrams per liter
MLLW	Mean Lower-Low Water
NGDC	National Geophysical Data Center
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
POA	Port of Anchorage
POC	parameters of concern
ppt	parts per trillion
RelRMS	relative root mean squared
TSS	total suspended solid
TSS_{AWWU}	concentrations for the Asplund WPCF sediment classes
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
WPCF	Water Pollution Control Facility
ZID	Zone of Initial Dilution

APPENDIX B

Hydrodynamic Model Results

B.1 Introduction

The U.S. Environmental Protection Agency Region 10 (EPA) is reviewing the Anchorage Water and Wastewater Utility (AWWU) application for renewal of the Asplund Water Pollution Control Facility (AWPCF) National Pollutant Discharge Elimination System (NPDES) permit and associated 301(h) waiver from secondary treatment standards for 5-day biochemical oxygen demand and total suspended solids (TSS). As a part of its decision process, EPA must obtain federal agency certifications that its proposed action (permit reauthorization) will not adversely affect threatened or endangered species or their critical habitats in the area, as listed by the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS). This is required to conform to Section 7 of the Endangered Species Act.

A biological evaluation (BE) is a critical component of consultation among EPA, NMFS, and USFWS with respect to the Asplund WPCF 301(h) waiver. Developing the BE requires evaluating the fate and transport of effluent-derived constituents throughout the critical habitat of the Cook Inlet (CI) population of beluga whales. A numerical model was developed and used to assist with this element of the BE.

B.1.1 Purpose

Numerical modeling of the transport and distribution of effluent and effluent constituents from the Asplund WPCF is required to support an ecological risk assessment appropriate for the BE. A three-dimensional (3D) hydrodynamic and transport model was developed for the Upper CI. The model was used to predict mixing and transport of effluent-derived water column and sediment constituents. This Appendix presents the model development, calibration, and applications for the Upper CI AWWU BE model.

B.1.2 Background

EPA has tasked AWWU with drafting a BE for listed species to support EPA Section 7 consultations with NMFS and USFWS.[1] The BE will be submitted to EPA and used by the agency to help determine whether permit reauthorization is likely to affect the continued existence of species protected by the Endangered Species Act or to adversely modify their habitat.

Understanding the exposure of endangered species to regulated and unregulated constituents based on migration, residence, habitat requirements, and circulation (including nearfield plume dilution and farfield circulation) is critical to support an

[1]Consultation letters from NMFS (25 June 2009) and USFWS (20 May 2009) to Lisa Olson/EPA indicate that the Cook Inlet population of beluga whales represents the only federally listed species to be included in this BE.

effective BE. Numerical modeling was used to quantify effluent-derived constituent concentrations in receiving waters and sediments.

Nearfield modeling was previously conducted (CH2M HILL, 1998) for this discharge using the EPA UDKHDEN initial dilution model and subsequent dilution routines based on a passive diffusion analysis (the Brooks method), which was accepted by EPA at that time. Updated nearfield modeling was conducted (Jacobs, 2024) using DKHW from the EPA Visual Plumes suite of models, the CORMIX1 initial dilution model, and subsequent dilution using the same passive dilution model as before. The CORMIX1 initial dilution model was selected to represent the AWPCF outfall discharge based on direct comparisons to extensive field-measured dilutions recorded under a wide range of tidal conditions (Jacobs, 2024). No additional nearfield modeling was conducted as part of this BE.

The Environmental Fluid Dynamics Code (EFDC) (Hamrick, 1996) model was selected as the most appropriate farfield model to address the mixing, fate, and transport of the parameters of concern (POC), based on experience with hydrodynamic models, plume modeling, CI, and the objectives of the BE. This model is in the public domain, has been widely applied in similar applications, is supported and endorsed by EPA for complex modeling to support environmental permitting, and has a graphical preprocessor and postprocessor (Craig, 2009) to assist in visualizing the model results.

The EFDC model is a general-purpose modeling package for simulating 3D flow, transport, and biogeochemical processes in surface water systems, including rivers, lakes, estuaries, reservoirs, wetlands, and near shore to continental shelf-scale coastal regions. The model was originally developed at the Virginia Institute of Marine Science for estuarine and coastal applications. In addition to hydrodynamic, salinity, and temperature transport simulation capabilities, EFDC includes sub-models to simulate sediment transport, eutrophication, and the transport and fate of toxic contaminants in the water and sediment bed.

EFDC is unique among advanced surface water models in using a single source code to interface hydrodynamics (Hamrick, 1992) with sediment transport (Tetra Tech, 2000), toxic chemicals (Tetra Tech, 1999), and eutrophication (Park et al., 1995) within a single source code (Hamrick, 1996). The code is widely used by federal agencies, including the U.S. Army Corps of Engineers, EPA, and the United States Geological Survey (USGS). Details of the physical and numerical basis of EFDC and an additional description of the model are provided in Attachment B1.

B.1.3 Approach

To investigate the physical processes, sediment dynamics, and POC concentrations in Upper CI, a 3D EFDC model was developed. The model quantifies the exposure of CI beluga whales and important prey species to effluent-derived constituents from the Asplund WPCF discharge. The model simulates the hydrodynamic and transport processes based on the following factors:

- Tidal forcing
- Density effects

- Open water and iced-over conditions
- An integrated near-field plume sub-model dynamically coupled to the farfield circulation model
- Wind-generated currents
- Inflow from major rivers
- Effluent loading from the Asplund WPCF

Because of the number of potential POCs, the transport and distribution of whole effluent was simulated by using a dye-tracer as a surrogate. The concentrations of individual effluent constituents were determined based on the concentration of effluent at any point in space and time represented by the dye-tracer concentration and the known or assumed concentrations of individual constituents in the whole effluent.

The model simulations were conducted for the following three representative categories:

- Conservative substances (no degradation of the dye tracer)
- Slowly degrading substances (half life of the dye tracer = 150 days)
- Rapidly degrading substances (half life of the dye tracer = 7 days)

To address the effluent-derived constituents that are bound to effluent-derived suspended solids (those with high octanol-water coefficients), the transport, distribution, and settling of effluent-derived suspended solids were simulated. It was assumed that those constituents with high octanol-water coefficients ($>10^5$) would be directly associated with the suspended solids. Sediment grain size distribution and loadings were based on available data and known characteristics of typical wastewater effluent. Effluent-derived sediment accumulation was estimated based on modeled sedimentation rates.

B.1.4 Scope and Limitations

The farfield model was configured to trace the concentration of whole effluent, using the dye tracer, from the Asplund WPCF. The concentrations of specific constituents can be directly determined from the known or estimated effluent concentrations.

The farfield model was developed and calibrated using available data. No additional field data were collected. Existing data from the National Oceanic and Atmospheric Administration (NOAA), the National Weather Service, the U.S. Army Corps of Engineers, and other available sources were assembled, analyzed, and, as appropriate, incorporated into the modeling process. The primary calibration was based on water level responses and NOAA velocity data. The intent of the model was to provide overall transport and average concentrations of whole effluent within the Upper CI. Detailed predictions of fine-scale temporal and spatial current patterns and associated fine-scale variations in effluent concentrations are not required for the purposes of the BE.

The model domain was configured to include the Class I critical habitat of the beluga whale.[2] The areal extent of the model domain was extended south to the Forelands, which is considered to be far enough south in CI to avoid significant tidal reflux of effluent back into the primary study area during a tidal excursion.

Representative model scenarios were considered. It is generally considered that winter ice cover conditions, with limited freshwater flows into the study area, represent the most critical period for flushing. To test this assumption, whole-year runs from end of winter to the next year's end of winter were conducted.

B.1.5 Conceptual Model

The CI above the Forelands (see Section F.2 for a detailed description of the model domain) is designated as the Upper CI. This region includes those areas of CI between the Forelands and Anchorage, Alaska, and the two major CI branches, Knik Arm and Turnagain Arm (refer to Figure B-1). This region is characterized by large tidal ranges of more than 8 meters at Nikiski and 10 meters at the Port of Anchorage (POA). These large ranges result in a very energetic system with a significant amount of horizontal and vertical mixing. Dissolved-phase constituents are vertically well mixed. This is particularly true in the shallower areas of Knik and Turnagain Arms.

The high-energy environment has a significant impact on the sediment dynamics in the Upper CI. Large-scale scour/deposition, bedload transport, and suspended load transport result in significant bathymetric changes year-to-year and, at times, even month-to-month. The origin of the sediments is largely glacial flour, which is delivered to the system by several rivers and streams. These sediments are transported within the Upper CI by current patterns driven by freshwater inflows, tides, and winds. The strong currents keep the main channel relatively clear from deposition. However, the tidal flats, large scale eddy zones, and edges of the channels experience periodic and often transient deposition and scour. Sediment transport processes can result in up to 10 meters of bed elevation change in relatively short time periods. The upper fringes of the tidal flats experience the least amount of energy and are, therefore, the main depositional areas within the Upper CI.

Within a tidal cycle, strong currents can resuspend sediments, subsequently depositing the same material as the tides approach slack tide. This process, along with the variation in bathymetry, results in significant lateral and temporal variation in sediment concentrations in the water column. There are significant vertical gradients of suspended sediments depending on the strength of the flows.

B.2 Model Domain

The primary objective of the modeling was to assess the distribution of Asplund WPCF discharge within the Class 1 critical habitat area (Figure B-1). Therefore, the model domain was developed primarily from beluga whale migration patterns. Available data and previous modeling studies were also considered. As mentioned above, the

[2]Currently, there is no other designated critical habitat in the project area.

southernmost limit of the model grid near the Forelands, as shown on Figure B-1, was located to provide ample coverage for the habitat in the vicinity of the Asplund WPCF discharge with sufficient down-inlet coverage to avoid significant tidal reflux effects in the vicinity of the discharge and the Class I critical habitat area.

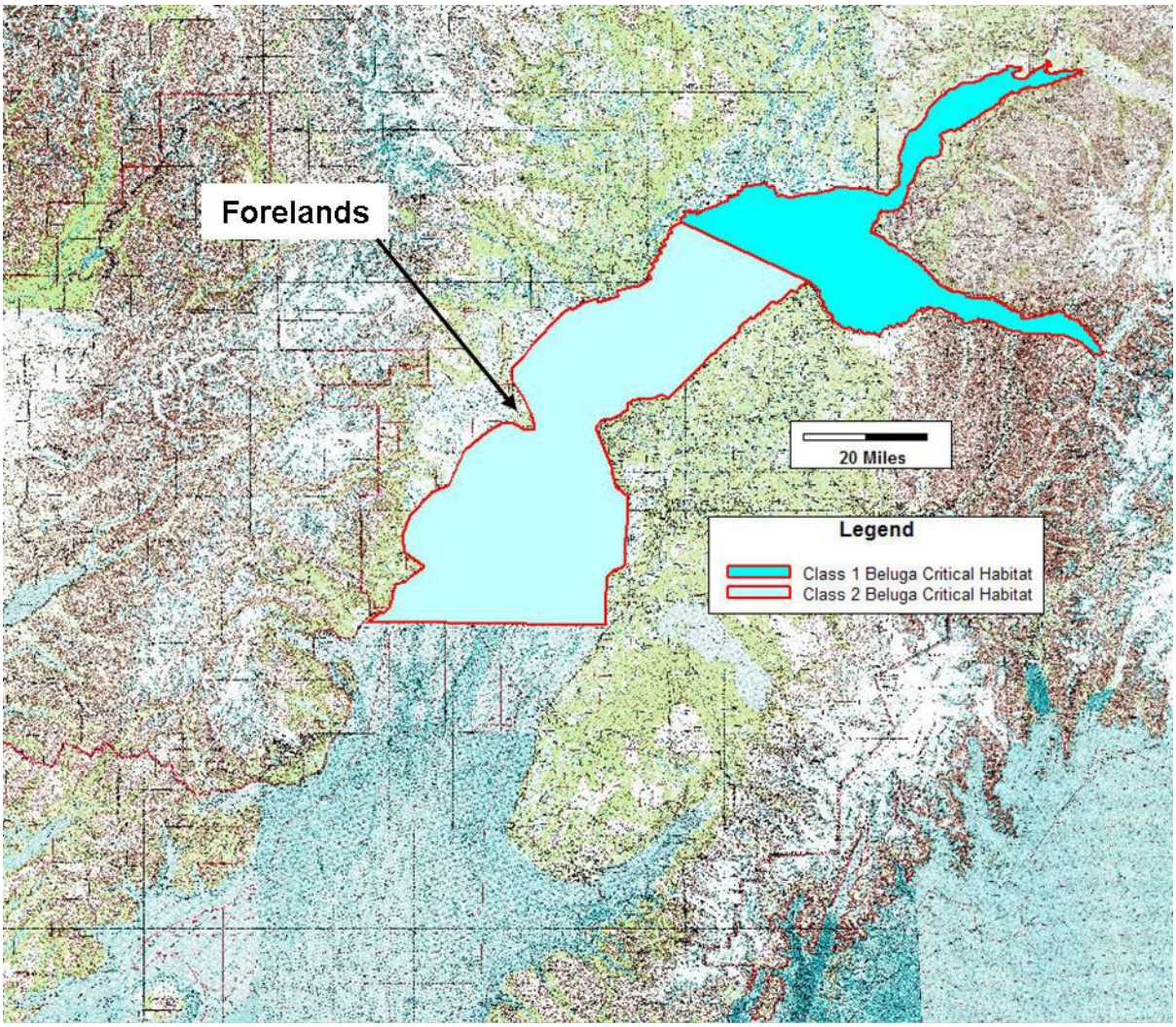


FIGURE B-1. CLASS 1 AND CLASS II CRITICAL HABITAT FOR COOK INLET BELUGA WHALES

A curvilinear orthogonal EFDC grid was constructed covering the model domain area, as shown on Figure B-2. This configuration has 9,321 horizontal computational cells with four sigma stretch depth layers[3] for a total of 37,284 computational cells. The average orthogonal deviation was approximately 0.4 degree, well below the acceptable upper limit of 3 degrees. The typical grid size is about 160 meters by 160 meters in the Knik Arm around the Asplund WPCF outfall diffuser and a maximum of 1,200 meters by 3,000 meters near the open boundary. Figure B-3 shows a detailed view of the grid,

[3]The model has four depth layers that maintain the same **relative** vertical dimensions as the total water depth changes; the layers stretch and compress to conform to the bottom elevation changes.

bathymetry in the area around the diffuser, and the currently established regulatory zone of initial dilution (ZID). The existing ZID for the AWPCF outfall is a distance of 650 meters. The proposed revised ZID is the same shape but approximately one-half the size in linear dimensions, with a distance of 350 meters from the AWPCF outfall turret to the ZID (Jacobs, 2024).

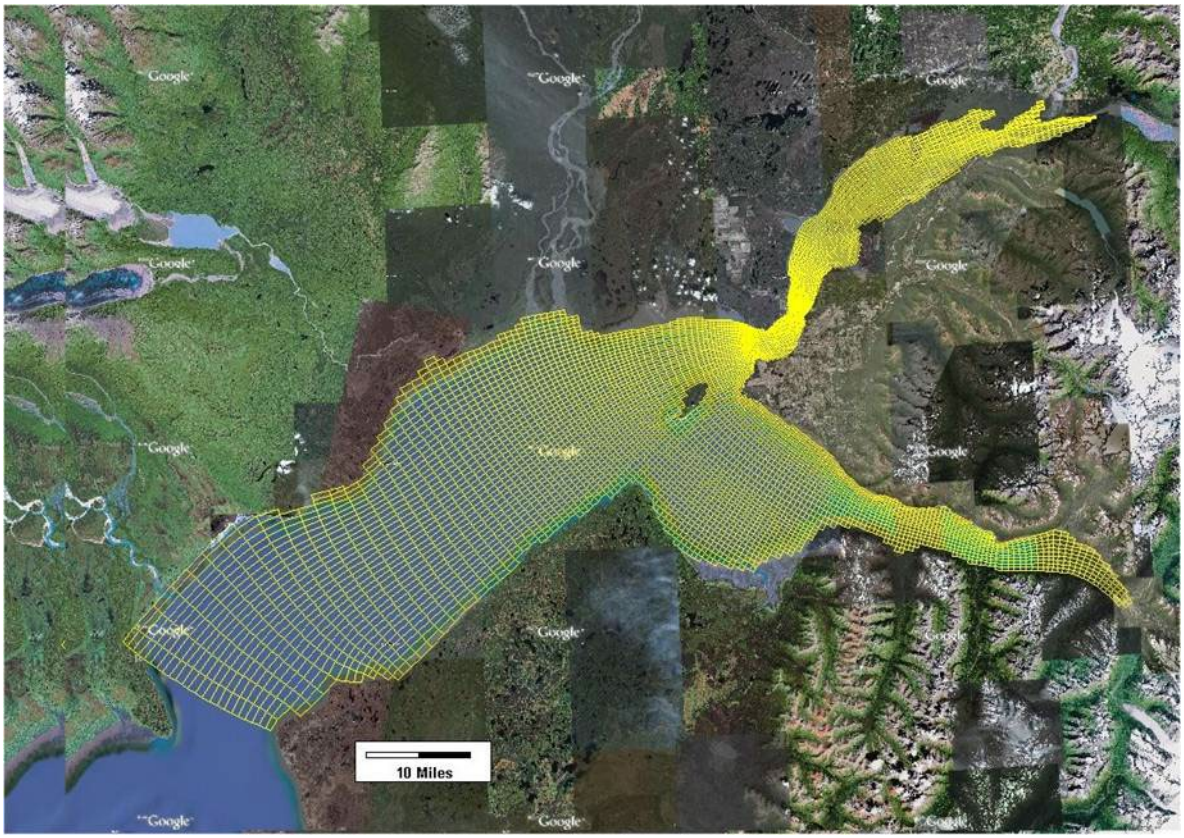


FIGURE B-2. UPPER COOK INLET EFDC MODEL GRID

B.3 Model Boundaries and Input

The bathymetry and boundary inputs were based on available data. These parameters are described in this section. These parameters, considering the scale of the model domain, are not considered to change significantly since the initial model development.

B.3.1 Datums

The vertical datum used for all water surface elevations and bathymetry was the Mean Lower-Low Water (MLLW), as defined at the NOAA Station “Anchorage, Knik Arm, CI, Alaska” (ID 9455920) at the POA.

The horizontal datum was WGS84[4]/NAD83[5], and the grid system is the Universal Transverse Mercator Zone 5. The area of interest spans two Universal Transverse Mercator zones, but the grid system coordinates were computed relative to Zone 5.

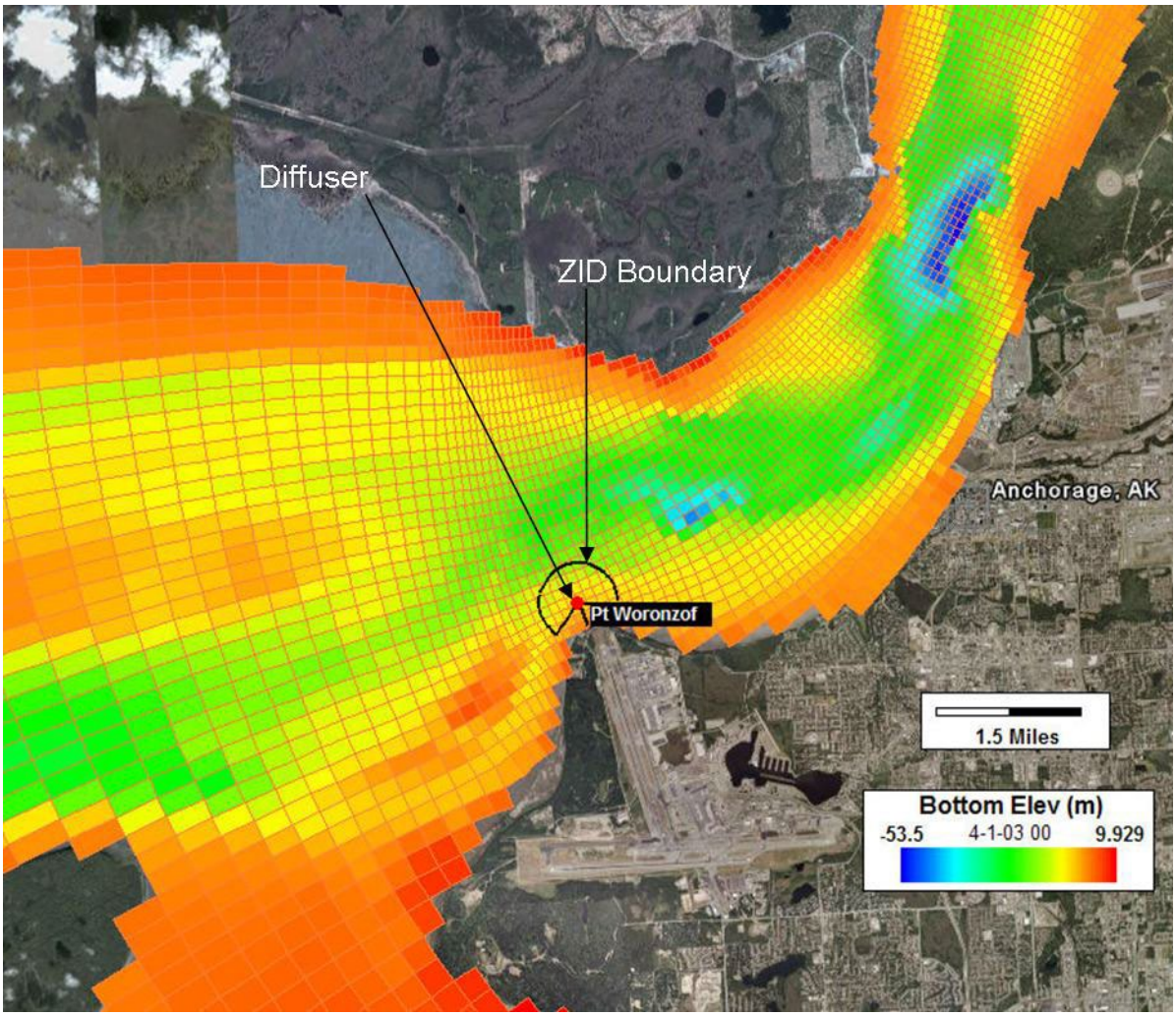


FIGURE B-3. EFDC GRID AND BATHYMETRY IN THE AREA AROUND THE ASPLUND WPCF OUTFALL DIFFUSER

B.3.2 Bathymetry

National Geophysical Data Center (NGDC)[6] bathymetric data were used as the primary data source. For the CI near Anchorage and the Knik Arm, the NGDC bathymetry surveys were generally conducted during the 1982 through 2004 period. The most recent data for each overlapping area were used to obtain the most recent representation of bathymetry available. NGDC bathymetric data are either not available or are out of date for Turnagain Arm and the upper part of Knik River. Bathymetry for these areas was interpolated from NOAA maps. The bathymetry from these sources

[4] World Geodetic System 1984 (dating from 1984; last revised in 2004).

[5] North American Datum 1983.

[6] (http://www.ngdc.noaa.gov/mgg/bathymetry/ relief.html).

was updated with data from the recently surveyed Knik Arm Bridge area and Turnagain Arm mud flat area.

Figure B-4 shows the bathymetric data for the vicinity of the Asplund WPCF discharge, which was surveyed by NOAA and the KABATA Knik Arm Bridge Project during 2003

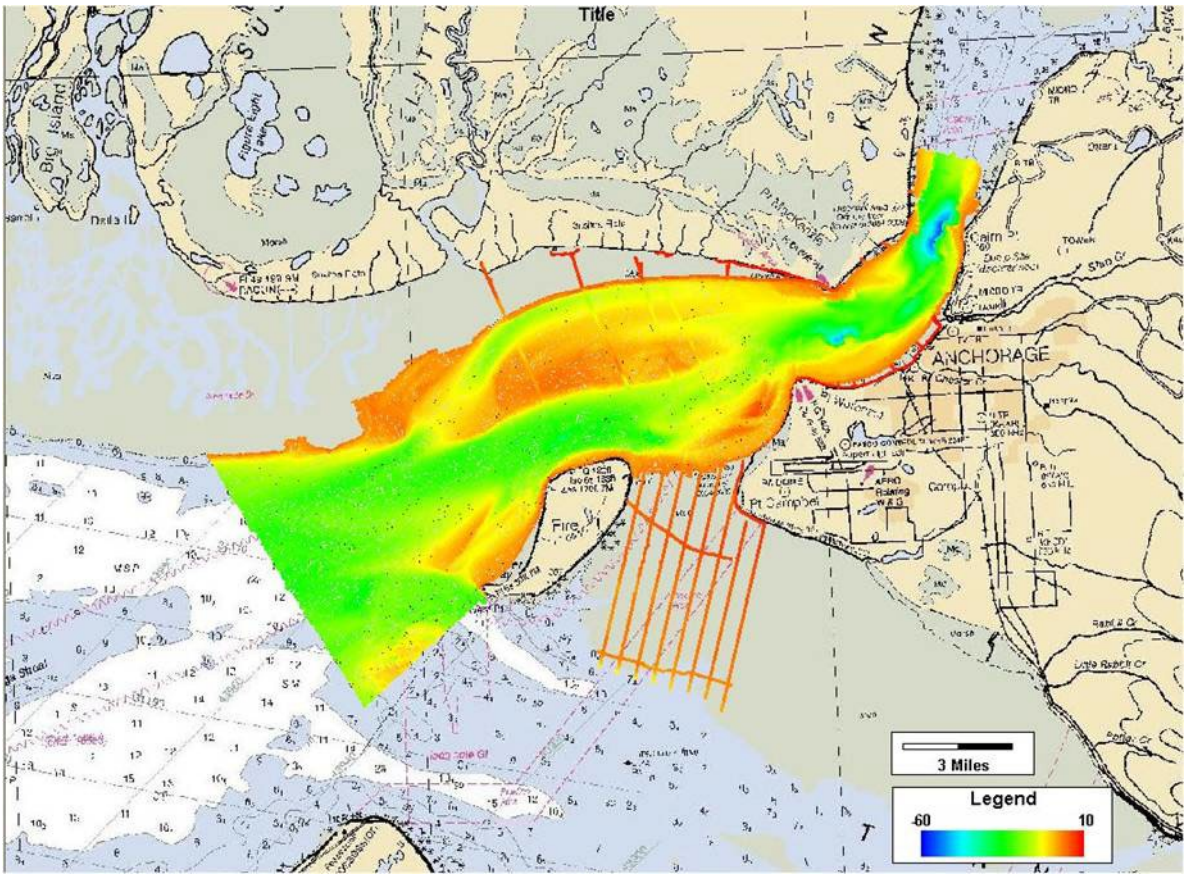


FIGURE B-4. 2003-2004 SURVEYED BATHYMETRY NEAR AWWU

through 2005. It is noted that prior to these data being incorporated into the final version of the Upper CI EFDC model, older bathymetry had been used for preliminary modeling. Preliminary dye tracer modeling results using the older bathymetric data were different than the final model dye tracer results. Using the older bathymetric data, the effluent was transported into Turnagain Arm much more than when using the final model bathymetry incorporating the more recent data bathymetric data. Figure B-5 represents the digital terrain model generated using the currently assembled bathymetric data for the model grid shown on Figure B-1.

A review of the historical bathymetric data in Knik Arm from the KABATA Report (HDR, 2007) indicates that bathymetry in the Knik Arm channel region is variable and can experience changes of as much as 7.5 meters within a decade. The latest available data were used for the model development; however, the highly changeable bathymetric conditions may limit the model in its representation of local flows at small scales in some locations. For the purposes of the BE, targeted at providing typical

overall conditions in the study area, the small-scale variability in flows is not considered a significant effect. In August 2022, a detailed bathymetry survey was conducted within 1,250 meters radius of the Asplund WPCF outfall site (Benthic GeoScience, 2022) for AWWU. This survey confirmed the bathymetry applied in the model for the region proximate to the outfall structure.

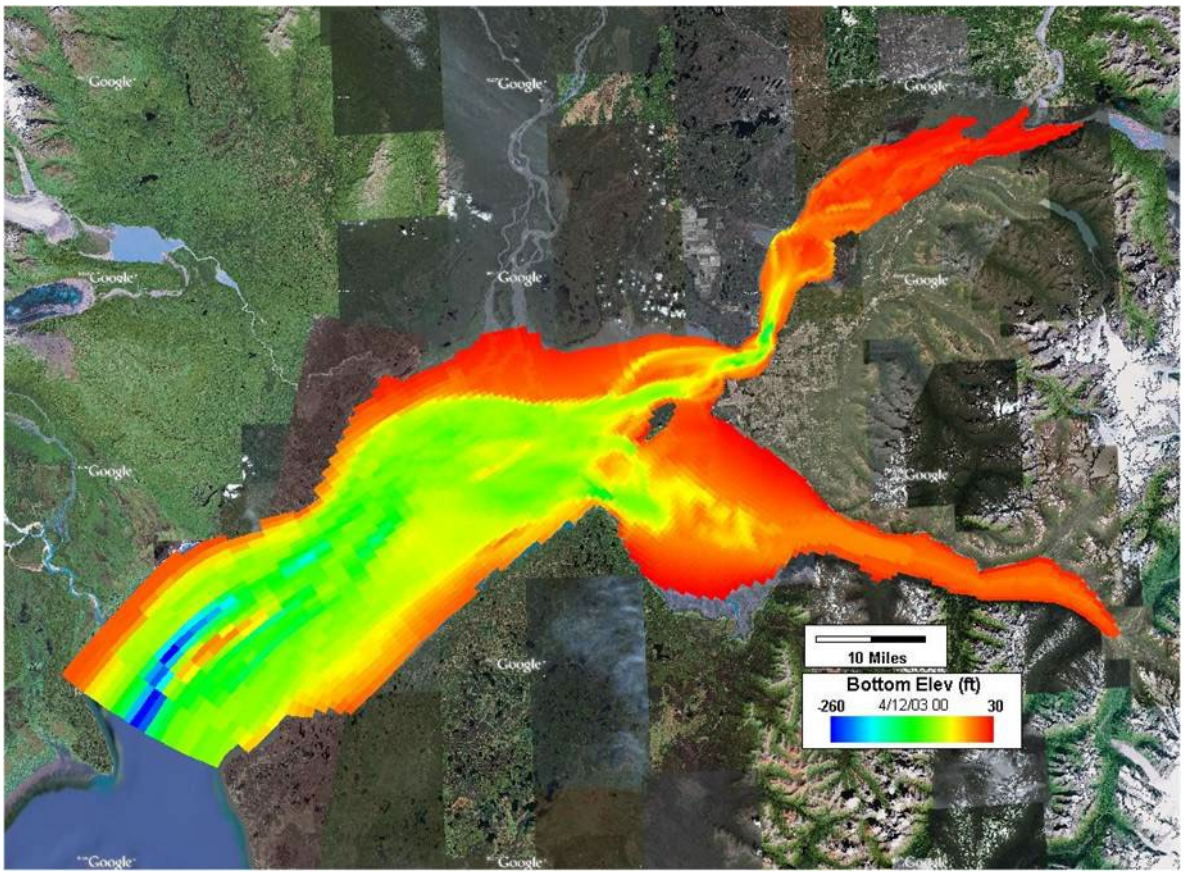


FIGURE B-5. FINAL EFDC MODEL BATHYMETRY

B.3.3 Suspended Solids

For the purposes of this BE, the loading of suspended solids into the Upper CI can be grouped into two major categories: natural sediments from rivers flowing into the Upper CI and suspended solids discharged from the Asplund WPCF diffuser. There are no data available for grain size or settling velocities for the Asplund WPCF effluent. Therefore, the Asplund WPCF effluent TSS grain size distribution was approximated based on the EPA 301(h) guidance document.[7]

Information on sedimentation in Upper CI and Turnagain Arm is very limited. After a review of the KABATA report (KABATA, 2006), it was decided to use the Knik Arm TSS data for the model. Eight sediment classes were used in the model, two non-settling classes, and six settleable solids classes. These classes were treated as non-cohesive

[7] Amended Section 301(h) Technical Support Document. EPA 842-B-94-007. United States Environmental Protection Agency, Office of Water. September 1994.

sediment classes within EFDC. Typical values for settling and scour parameters based on Van Rijn's (1984) approach were applied. No available data exist to perform additional calibration for sediment transport. Model simulations based on the available data and generalized for the sedimentation parameters are considered to be sufficient and appropriate for the purposes of this BE.

Unique sediment classes were used to distinguish between effluent-derived sediments and natural sediments. This enabled evaluating percent contributions from effluent-derived sediments compared to natural sediments during post-processing of model results.

The following sediment classes were used:

- Non-Settleable Sediment Classes
  - Class 1 – AWWU: 50 percent of Asplund TSS loadings
  - Class 2 – NATURAL: 10 percent of freshwater TSS loadings
- Settleable Sediment Classes
  - Class 1 – AWWU: 30 percent of Asplund TSS loadings, particle size 9 microns
  - Class 2 – Natural: 30 percent of freshwater TSS loadings, particle size 25 microns
  - Class 3 – AWWU: 20 percent of Asplund TSS loadings, particle size 30 microns
  - Class 4 – Natural: 20 percent of freshwater TSS loadings, particle size 60 microns
  - Class 5 – Natural: 20 percent of freshwater TSS loadings, particle size 125 microns
  - Class 6 – Natural: 20 percent of freshwater TSS loadings, particle size 250 microns

Separating the sediments into these classes allowed the separate analysis of each size class and provided a method of estimating the Asplund WPCF contribution to both the water column TSS and the bottom sediment deposition. Because of complexity and the lack of data, bedload transport and initial bed conditions were not considered. The approach used provides an estimate of the fraction of effluent-derived sediments in total sediment deposition and is sufficient for the purposes of this BE.

B.3.4 Boundary Conditions

Boundary conditions (BC) were assigned to the appropriate grid cells based on location and BC type. The boundary types are:

- Ocean tidal forcing on south side (open boundary)
- Freshwater inflows of water from rivers along coastline
- Jet/plume for the AWWU discharge

Figure B-6 shows the EFDC model grid with the BC locations identified and labeled by boundary group.

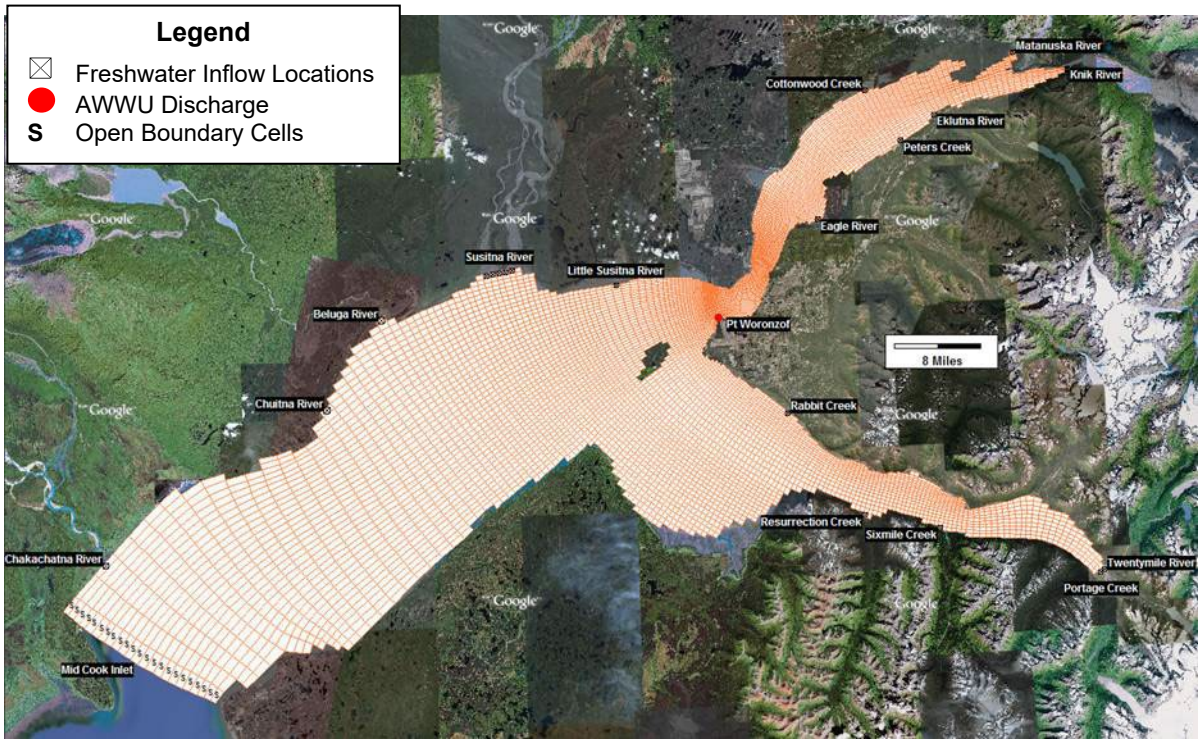


FIGURE B-6. EFDC BOUNDARY CONDITION LOCATION MAP

B.3.4.1 Open Boundary

For the model grid shown on Figure B-1, the open boundary was set using data derived from the NOAA Nikiski tidal station (ID 9455760). The time series of water surface elevations applied at the open boundary is shown in Attachment B2.

B.3.4.2 Flow Boundaries

A number of major rivers flow into the Upper CI. USGS flow data are available for some of these rivers.[8] These data from the available stations for the corresponding flow boundaries are listed in Table B-1. Non-gauged inflows into Upper CI were estimated based on watershed size and time-variable areal unit flow rates from comparable gauged streams (data are provided in Attachment B2).

Water Temperature

There are only two stations in Upper CI (the POA and Nikiski) that record water temperature. The water temperatures at Nikiski were used for the open tidal forcing boundary, while the temperatures at POA station were used for calibration. These data were filtered, and obviously bad data were removed.

[8] (http://waterdata.usgs.gov/ak/nwis/si).

There is very little available information on water temperature of the rivers flowing into the model domain. Therefore, the water temperatures recorded for the Kenai River (USGS 15258000) were used for all flow boundaries in the model.

Table B-1. List of United States Geological Survey Flow Stations

Flow BC Name	USGS Station	Station Name	Data Date	Drainage Area (sq km)
Resurrection C	15267900	Resurrection C near Hope	1983	149
Sixmile C	15271000	Sixmile C near Hope	2003	234
Portage C	15272280	Portage C at Portage Lake Outlet near Whittier	2003	41
Twentymile R	15272380	Twentymile R near Portage	2003	141
Rabbit C	15273045	Rabbit C at Old Seward Hwy near Anchorage	2007	13
Eagle R	15277100	Eagle R at Eagle	1978	192
Peters C	15277410	Peters C near Birchwood	1980	88
Eklutna R	15280200	Eklutna R at Old Glenn Hwy at Eklutna	2003	172
Knik R	15281000	Knik R near Palmer	2003	1,180
Matanuska R	15284000	Matanuska R at Palmer	2003	2,070
Susitna R	15294350	Susitna R at Susitna Station	1990	19,400
Cottonwood	15286000	Cottonwood C near Wasilla	1996	74
Chuitna R	15294450	Chuitna R near Tyonek	1983	131

Salinity

The salinity was measured in an oceanographic transect across the Forelands in spring and fall 2002 (Okkonen, 2003). The salinity varied between 22 to 25 parts per trillion (ppt). Therefore, a value of 24 ppt was specified at the open boundary during the model simulation period. The water flowing from all rivers was considered as fresh (zero salinity) for model simulations.

Solids

TSS data at some USGS stations on several rivers are available, as listed in Table B-2; the number of samples and the period they were taken are also indicated. The model requires time-series input data. A regression relation between TSS and flow as a power function was constructed to generate the TSS required time-series. However, application of regression equations is limited to the normal flow condition in the range of reported samples. For the extremely high flow condition in the Susitna River, the resulting TSS series was reduced to a reasonable range during model runs. For the rivers without TSS data, equations from similar scouring or non-scouring rivers were used. The TSS time series were then divided into one non-settling class and four non-cohesive sediment classes as described above.

Table B-2. Summary of Flow versus Total Suspended Solid Concentration Regressions

Station Name	USGS ID	Data Period		N	Equation	R^2
		From	To			
Resurrection C near Hope	15267900	25/Jun/68	13/May/71	16	$1.7018Q^{0.6768}$	0.4217
Eagle R at Eagle River	15277100	13/Sep/66	21/Jun/71	33	$5.154Q^{0.8603}$	0.7632
Peters C near Birchwood	15277410	19/Nov/80	6/Oct/81	9	$1.6642Q^{1.0785}$	0.6065
Knik R near Palmer	15281000	19/Jul/53	26/Jul/65	78	$3.8933Q^{0.8425}$	0.6628
Matanuska R at Palmer AK	15284000	11/Jun/52	21/Aug/07	305	$2.8782Q^{1.1343}$	0.6174
Susitna R at Susitna Station	15294350	15/Oct/52	28/Aug/85	105	$0.0069Q^{1.705}$	0.7410
Rabbit C at Old Seward Hwy	15273045	31/Jul/84	28/Mar/85	19	$6.8581Q^{0.4384}$	0.3727
Eklutna R	15277600	21/Jun/85	27/Aug/87	35	$4.4172Q^{1.2318}$	0.8187

N = number of samples

Asplund WPCF Discharge

The coupling of the nearfield diffuser release to the farfield model was accomplished using the EFDC jet/plume boundary type. This method incorporates nearfield plume dynamics to vertically spread the effluent into the water column within the cell in which the discharge is located. Once distributed using this computational approach, EFDC then applies the standard advection/diffusion approach to simulate subsequent farfield transport.

The discharge from the Asplund WPCF was set to a constant 35 million gallons per day for all of the computational periods. This reflects the expected monthly average discharge described in the previous 301(h) permit application and is essentially the same the same as the current effluent discharge rate. Monthly TSS concentration data for the Asplund WPCF (Attachment B2) were divided into three classes, as described above. The ratio of the TSS mass loading rate from the Asplund WPCF to total natural sources was about 1:50,000 (Table B-3) during the 1-year simulation. The effluent-derived sediment is about 0.002 percent of the natural suspended sediment load

As described above, for the dissolved phase constituents, a dye tracer with concentration of 1.0 milligram per liter (mg/L) in the effluent was used. Typically, the monthly temperature of released water was much warmer than the ambient water, resulting in an effluent concentration distributed throughout the entire water column in the discharge cell.

Table B-3. TSS Mass Loading from April 1, 2003, to March 31, 2004

TSS Loading Sources	Mass Loading (Million Tons)
Natural TSS	
Matanuska R	492,000
Knik R	575,000
Eklutna R	31.2
Peters C	259
Eagle R	4,170
Rabbit C	6.2
Resurrection C	162
Sixmile C	532
Portage C	571
Twentymile R	1,010
Little Susitna R	103
Beluga R	863,000
Chuitna R	1,070
Chakachatna R	2,350
Susitna R	7,930,000
Total	9,870,000
AWWU	
Asplund WPCF	197
AWWU/Natural Loading Ratio	*1:50,102*

B.3.4.3 Meteorological/Atmospheric Data

Wind and atmospheric data from the Anchorage airport meteorological station data (WBAN 26451) were used for model input. The Anchorage airport is located at Point Woronzof adjacent to the Asplund WPCF outfall site. Figure B-7 provides a wind rose for the model simulation period of April 1, 2003, through March 31, 2004. Annual wind stick plots are provided in Attachment B3.

The surface wind shear, and thus wind-induced currents and mixing, was turned off during the winter period (29 December to 22 March) to account for ice effects on the system. Air temperature, atmospheric pressure, and humidity were from the same source used in the model. Solar radiation was estimated from theoretical levels using latitude/longitude and typical cloud cover observations.

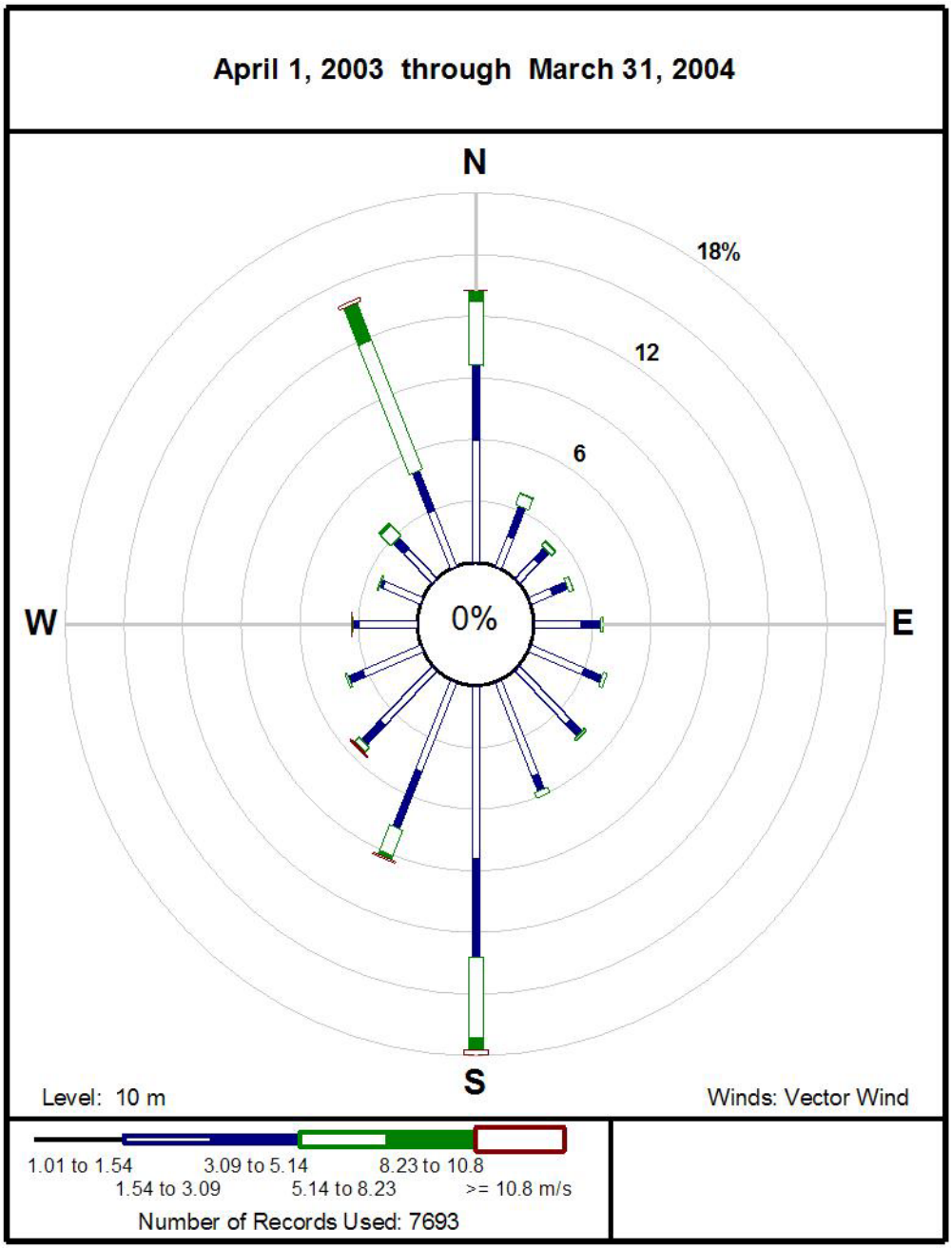


FIGURE B-7. WIND ROSE OF THE ANCHORAGE AIRPORT METEOROLOGICAL DATA: APRIL 2003 TO MARCH 2004

B.4 Model Calibration

The EFDC model was calibrated for the 2003 to 2004 period. This period was chosen for the overlap of calibration data sets, primarily NOAA velocity data. The model was calibrated against measured data at representative locations within the domain. The primary data for calibration consisted of water levels recorded at the POA NOAA gauge,

current velocities from five acoustic Doppler current profiling (ADCP) current meter stations, and temperatures from the POA.

B.4.1 Tidal Levels

Water level was calibrated using data from the Anchorage NOAA data station (ID 9455920). During calibration, the tidal series of Nikiski at the open boundary was adjusted by 1.239 meters in level and 45 minutes in time to obtain the best comparison of both water level and velocity. The need for such an adjustment is not uncommon to this type of modeling and, in this case, was primarily required to adjust the tidal amplitudes at Nikiski to the MLLW datum at Anchorage and to obtain the best fit of calibration results in the study area. It is noted that water level and velocity were calibrated simultaneously to avoid conflicting effects.

Figure B-8 shows the comparison of water level between the model calculations and the data at the Anchorage NOAA station. These calibration results are very good, with water levels at the POA accurately simulated by the model both in phase and amplitude.

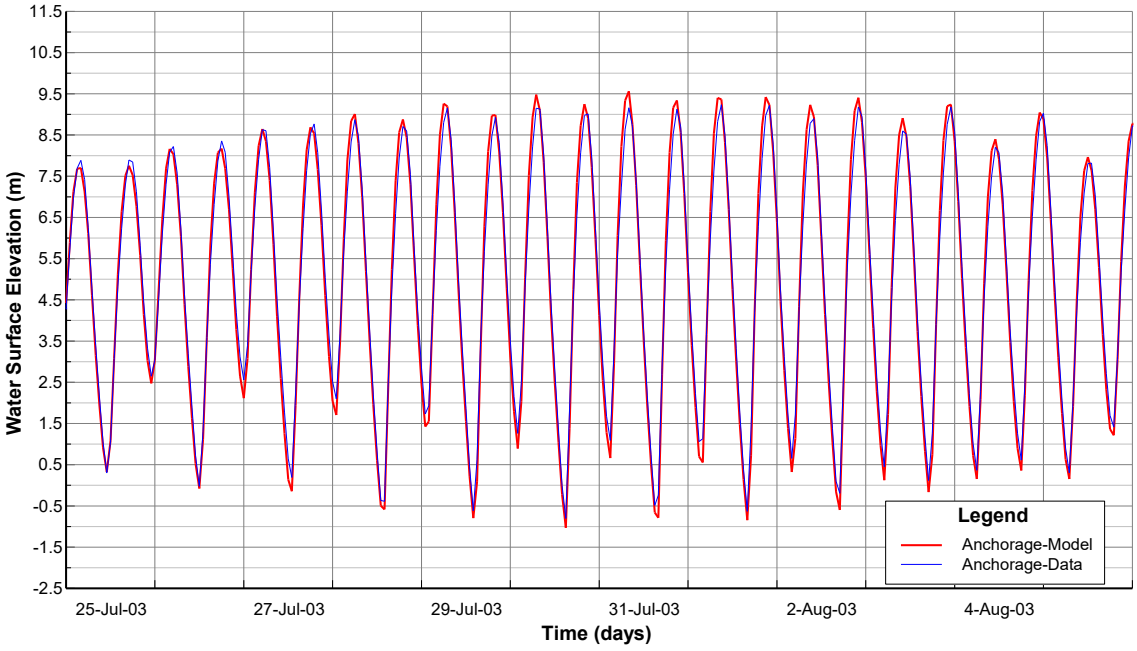


FIGURE B-8. MODEL PREDICTION VERSUS OBSERVED TIDAL DATA AT PORT OF ANCHORAGE

B.4.2 Velocity

ADCP velocity data from five NOAA stations (Table B-4) were used for calibration. The data were downloaded from http://tidesandcurrents.noaa.gov. The ADCP East and North velocity components were depth-averaged for comparison to the EFDC-computed depth-averaged velocities.

Table B-4. List of NOAA ADCP Stations Used for Velocity Calibration

Station Name	Station ID	Latitude	Longitude
Beluga Shoal	COI0307	61° 6.082' N	150° 33.693' W
Fire Island	COI0306	61° 9.651' N	150° 33.895' W
Knik Arm, NW of POA	COI0301	61° 16.693' N	149° 53.671' W
Knik Arm, East Side	COI0302	61° 16.478' N	149° 52.933' W
Port Mackenzie	COI0303	61° 15.135' N	149° 55.240' W

Figures F-9 and F-10 provide plan views of the velocity pattern during a typical tidal cycle for ebb and flood conditions. The black vectors display the model results (only every sixteenth vector was plotted to prevent overcrowding), and the red vectors are the corresponding NOAA ADCP-measured velocities for that same time in the tidal cycle indicated in the inset in the lower left corner of the figure.

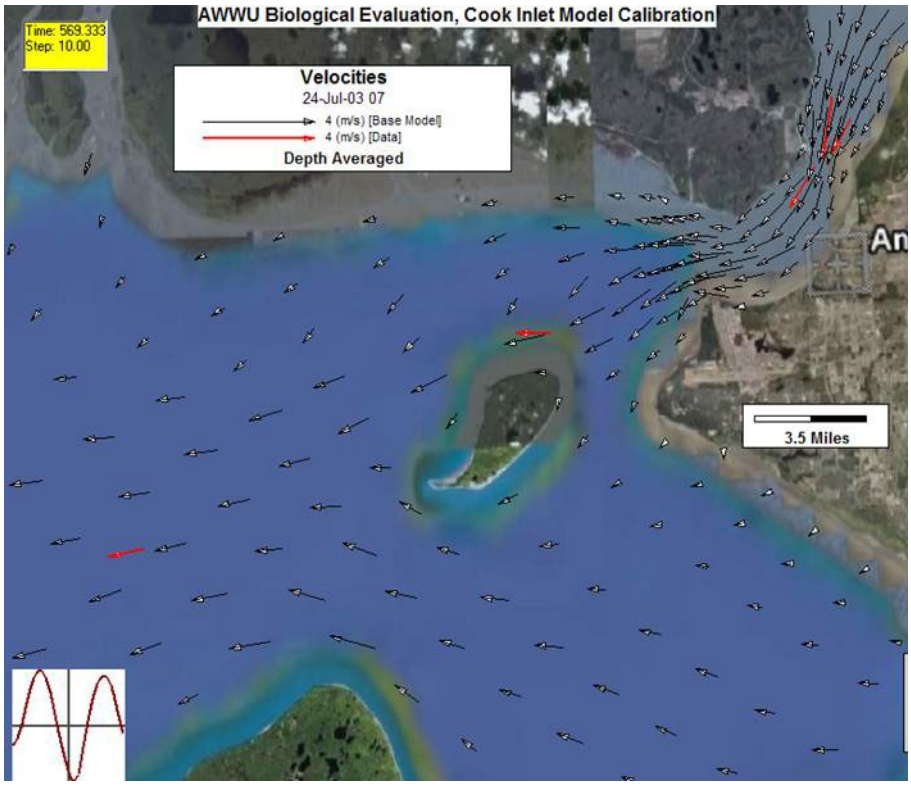


FIGURE B-9. 2D PLAN VIEW OF VELOCITY COMPARISONS WITH NOAA ADCP: EBB TIDE

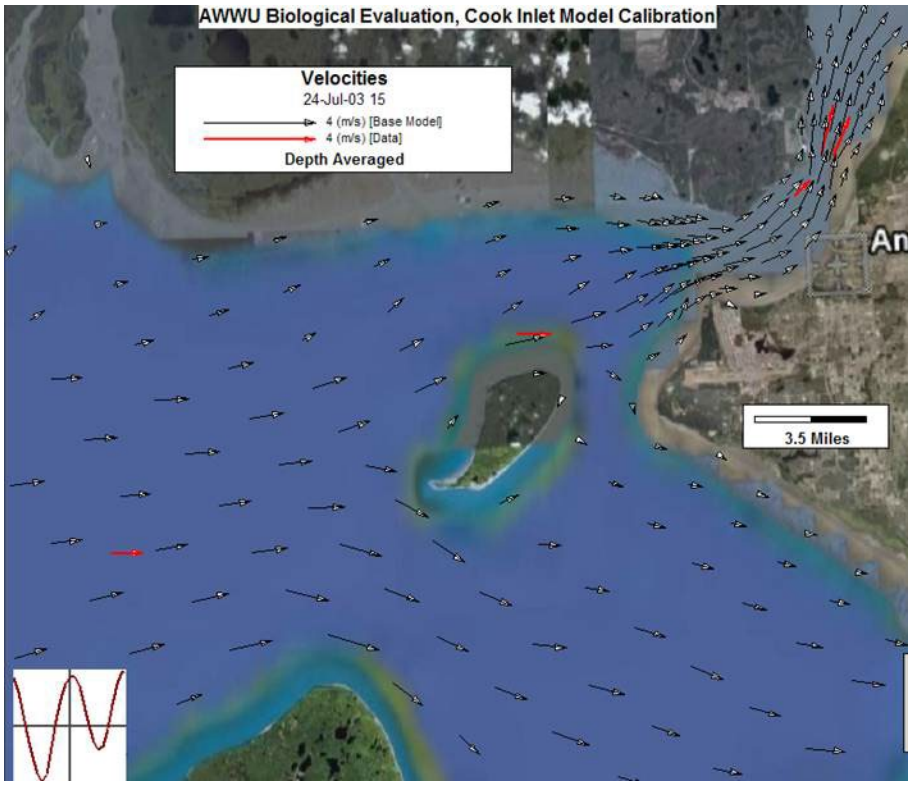


FIGURE B-10. 2D PLAN VIEW OF VELOCITY COMPARISONS WITH NOAA ADCP: FLOOD TIDE

Figures F-11 and F-12 compare east and north velocity components at Beluga Shoal in the center of the model and at Knik Arm NW of the POA. Good agreement was obtained for the velocity components for the Beluga Shoal, Knik Arm NW, and Fire Island measurement stations. The velocity calibration at Port Mackenzie (Figure B-13) was not as good. This is believed to result from the complexity of the fine-scale hydrodynamic conditions around Cairn Point relative to the coarse grid used in the model. Eddies off Cairn Point have been observed just after ebb flow starts. These eddies were not reproduced in the model. It is believed that the Port McKenzie station velocities recorded by the NOAA ADCP were influenced by this eddy, thus contributing to the differences in the observed and modeled velocities. The model, with a grid size of 160 meters by 160 meters, is limited in its ability to simulate such eddies. It is estimated that it would take a grid refinement of approximately four times smaller cells (resulting in 16 times more cells in the Cairn Point region) to reproduce the eddy. The objectives of the Upper CI model to address fate and transport of the Asplund WPCF effluent and simulate overall effluent concentrations within the Class 1 beluga habitat area are not compromised by the lack of such fine-scale and transient circulation features. The velocity calibration is generally very good and is sufficient for the purposes of this BE.

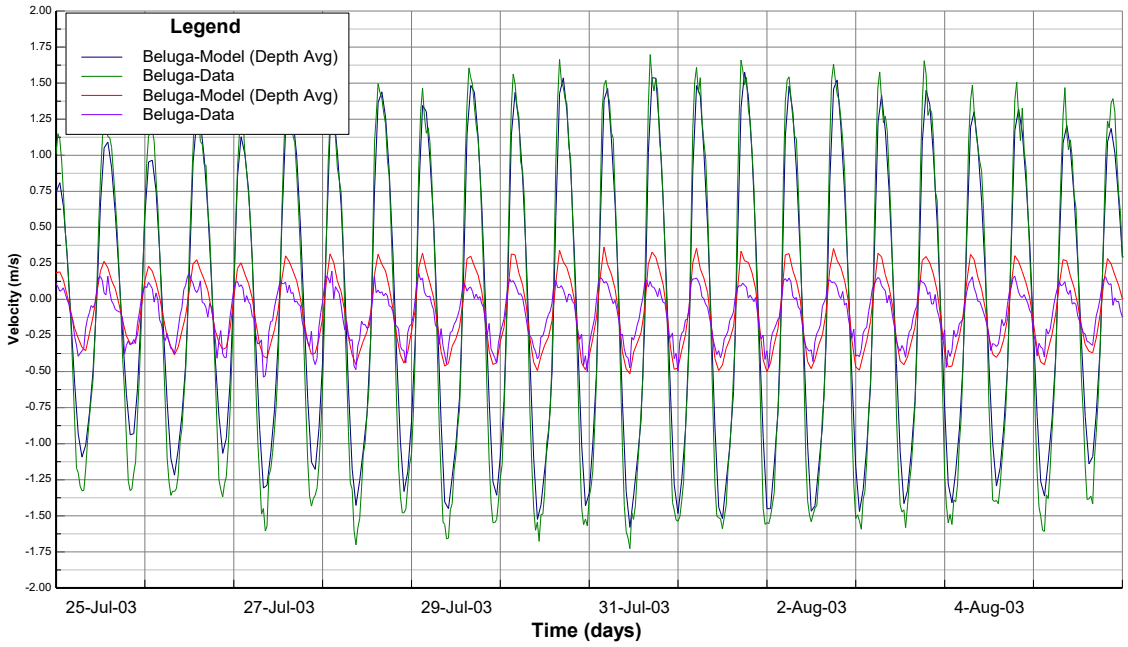


FIGURE B-11. VELOCITY COMPONENT COMPARISONS AT BELUGA SHOAL

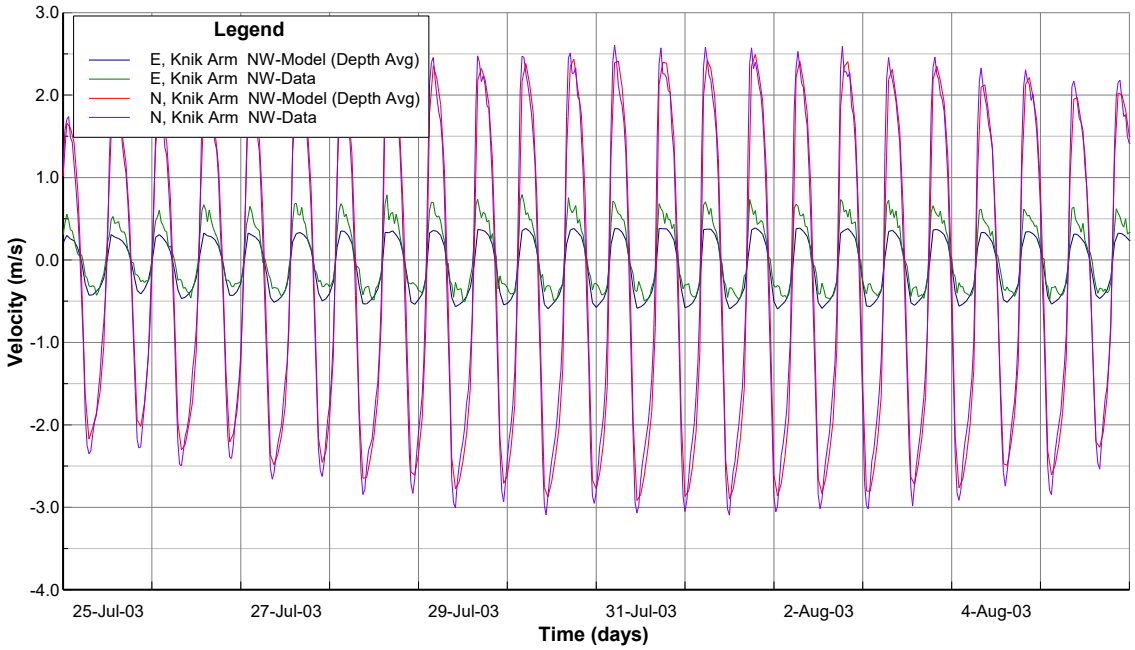


FIGURE B-12. VELOCITY COMPONENT COMPARISONS AT KNIK ARM NW

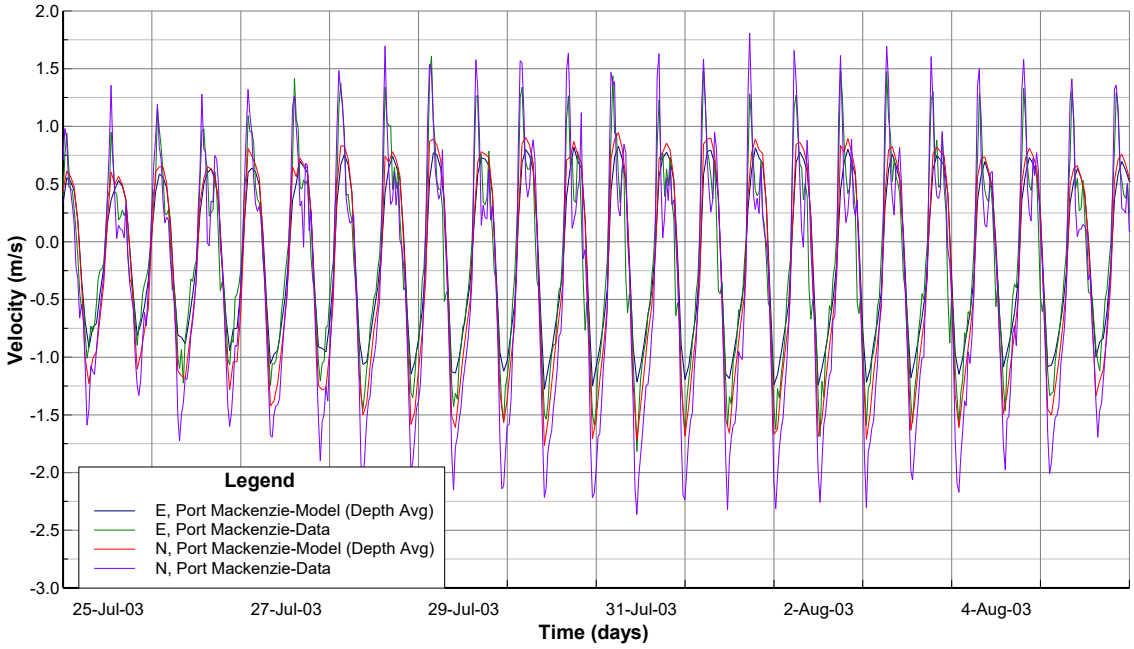


FIGURE B-13. VELOCITY COMPONENT COMPARISONS AT PORT MACKENZIE

B.4.3 Temperature/Salinity/Ice Cover

General transport process calibration was done using water temperatures. Temperature calibration was based on data from the Anchorage NOAA station. The EFDC model does not include a specific ice cover sub-model. The approach used to address the winter "ice" condition was to turn off surface wind forcing for the area of the model expected to be frozen over. This approach removed any wind-driven currents and/or mixing during the winter period and is considered adequate for the purposes of this BE. For the water temperature simulations, the EFDC model was modified to address the winter period by limiting the water temperature to just above the freezing point for salt water. A simple linear relationship was used if the computed water temperature was less than 0°C. The temperature was computed as follows:

$$Temperature = -1.3\left(\frac{Salinity}{35}\right) \quad (1)$$

Where: temperature is in °C and salinity is salinity in gallons per liter (g/L).

This approach does not account for ice processes and the heat gain/loss during the winter-time. However, it does produce a reasonable temperature to be used for the fate and transport computations in EFDC.

Figure B-14 shows the time-series comparison for the calibration period. These calibration results were good and indicate that the general transport processes were well simulated by the model.

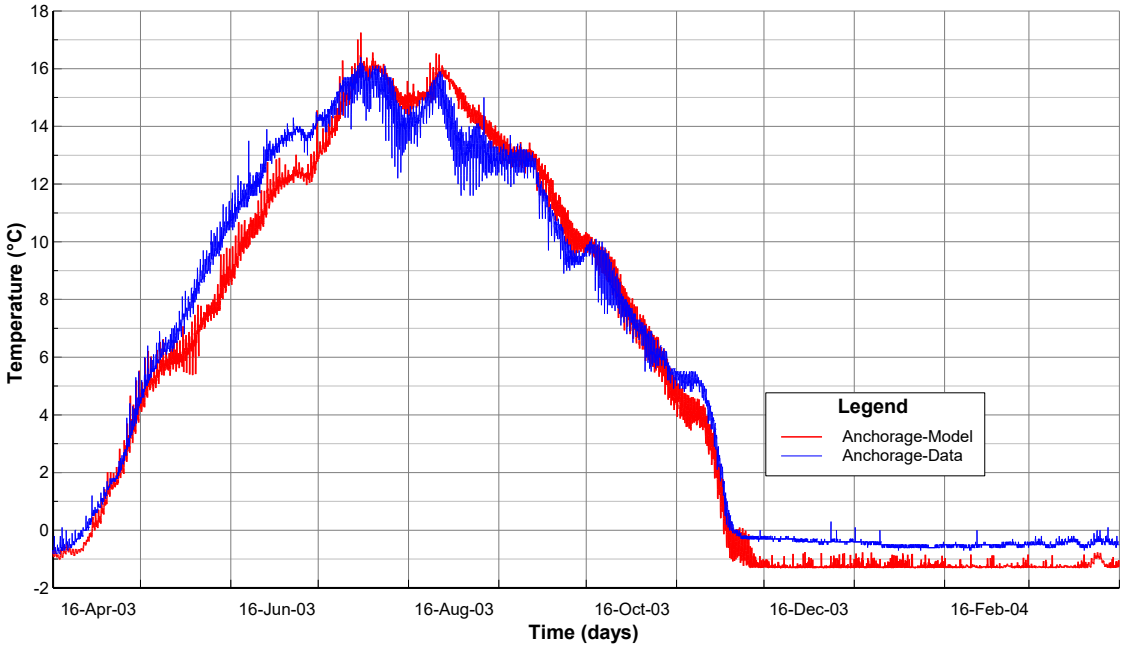


FIGURE B-14. WATER TEMPERATURE CALIBRATION, TIME-SERIES COMPARISON

Very few salinity measurements were available. For the Knik Arm Bridge Environmental Assessment, discrete salinity measurements were taken from July 27 to August 2, 2004, in the Knik Arm bridge area. These data were in the range of 4.0 to 6.0 ppt, with an average of 5.0 ppt on the surface and 5.4 at the bottom. The simulated salinities for 2003 (Figure B-15) were higher than those observed for 2004; however, the freshwater inflows were likely different, which would affect the overall transport in this area and result in somewhat different salinities. The predicted salinities support the overall calibration and the modeling objectives.

B.4.4 Summary of EFDC Hydrodynamic Calibration

The calibrated hydrodynamic model adequately reproduces the Upper CI advection and diffusion of dissolved/suspended material in the water column. Table B-5 summarizes the relative root mean squared (RelRMS) error statistic for each of the calibration parameters and stations.

$$RelRMS = \frac{\sqrt{\sum_{i=1}^{N}(o_i - x_i)}}{(O_{max} - O_{min})} * 100 \quad (2)$$

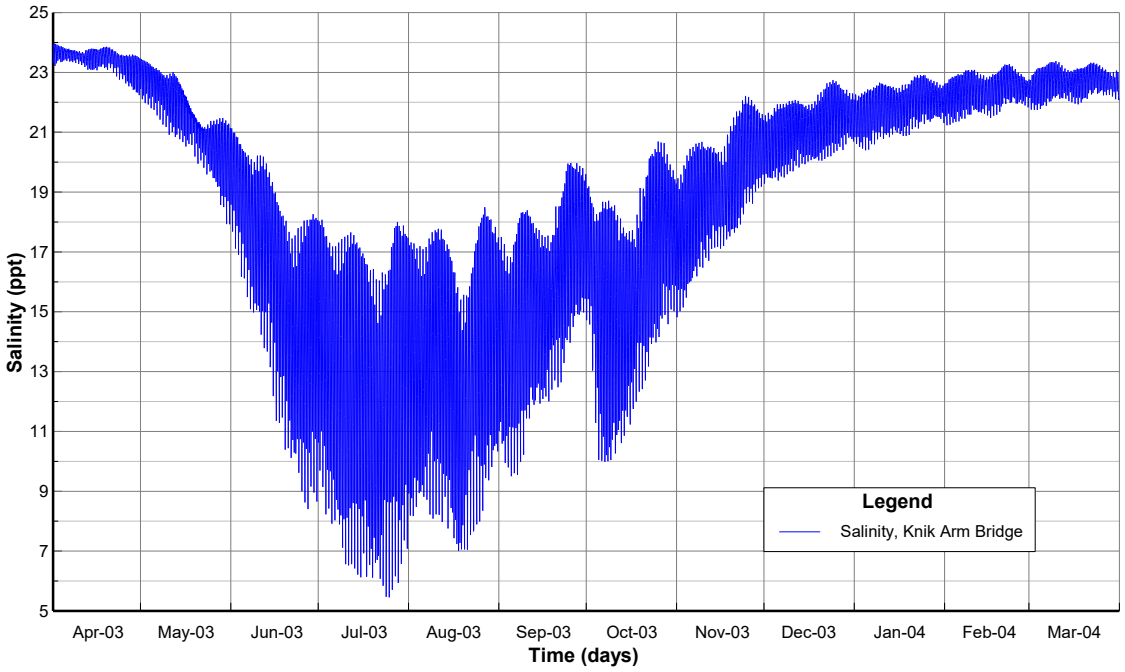


FIGURE B-15. COMPUTED SALINITIES IN THE KNIK ARM UPSTREAM OF CAIRN POINT

Table B-5. Calibration Period Summary Statistics: Relative RMS

Station ID	Parameter	Layer/ Type	Starting Date/Time	Ending Date/Time	# Pairs	Rel RMS	Data Average	Model Average
Water Surface (meters above MLLW)								
Anchorage	Elevation	Surface	2003-04-01	2004-04-29	9,461	2.7	5.024	4.996
Velocity Components (m/s)								
Beluga	X	Depth Avg	2003-07-15	2003-08-17	1,587	5.8	-0.101	-0.06
	Y	Depth Avg	2003-07-15	2003-08-17	1,587	15.9	-0.102	-0.075
Fire Island	X	Depth Avg	2003-07-15	2003-08-19	1,688	8.3	-0.109	-0.121
	Y	Depth Avg	2003-07-15	2003-08-19	1,688	62.2	0.003	-0.005
Knik Arm NW	X	Depth Avg	2003-07-15	2003-08-19	1,674	11.4	0.028	-0.086
	Y	Depth Avg	2003-07-15	2003-08-19	1,674	4.7	-0.257	-0.253
Knik Arm E	X	Depth Avg	2003-07-15	2003-08-19	1,508	8.2	0.025	0
	Y	Depth Avg	2003-07-15	2003-08-19	1,508	11.4	0.256	0.117
Port Mackenzie	X	Depth Avg	2003-07-15	2003-08-19	1,685	9.3	-0.153	-0.138
	Y	Depth Avg	2003-07-15	2003-08-19	1,685	8.9	-0.348	-0.235
Temperature (°C)								
Anchorage	Temperature	Layer 4	2003-04-01	2004-04-29	9,370	5.2	5.459	5.001

This evaluation indicates that the hydrodynamic calibration of the Upper CI model was acceptable and supports the use of the EFDC model for the purposes of this BE.

B.4.5 Total Suspended Solids

As mentioned above, sediment transport was not calibrated. The sediment modeling for the Upper CI model was used to address sediment influx from the rivers and the Asplund WPCF effluent, sediment deposition/resuspension, and suspended sediment advection/diffusion. The initial condition sediment beds were set to zero and bedload transport was not simulated. The objective of the sediment transport modeling for this BE was to obtain reasonable TSS concentrations and behavior.

Figure B-16 shows a time series of the computed TSS concentrations near the Asplund WPCF diffuser for the simulation period. The range of TSS values is consistent with historical discrete water column samples of TSS in Knik Arm, which range from a few hundred mg/L to more than 4,000 mg/L. The simulated values are in overall agreement with the historical observations.

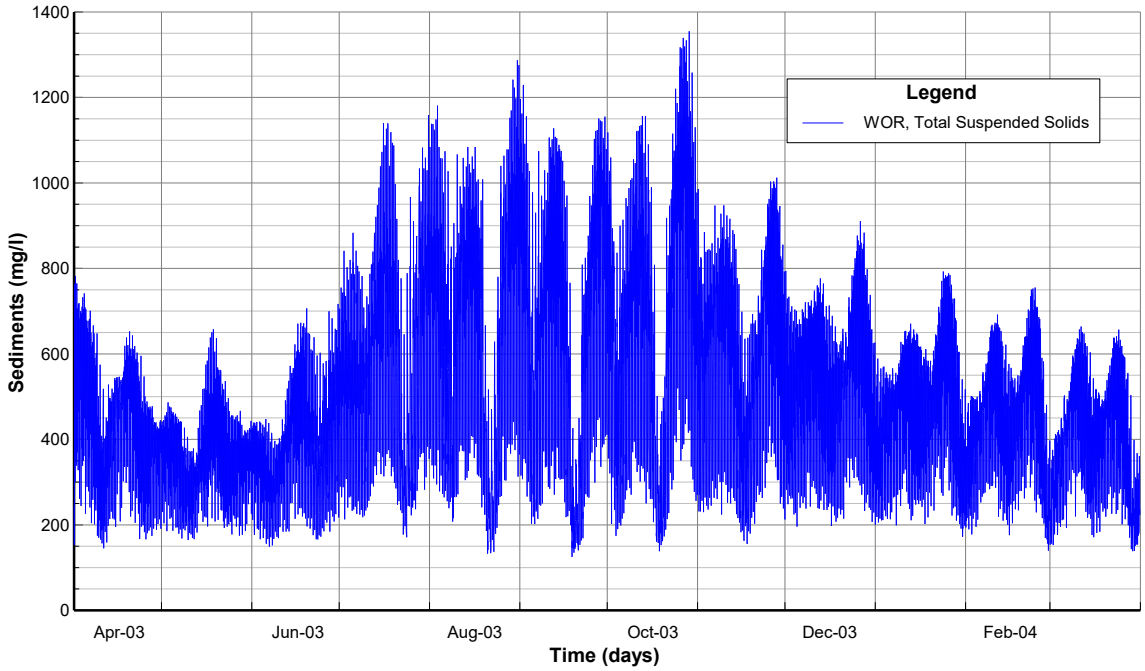


FIGURE B-16. COMPUTED TSS IN THE VICINITY OF THE ASPLUND WPCF DIFFUSER

B.5 Model Results

Using the calibrated model, three simulation scenarios were set up and run for a 1-year period using input data from 1-April- 2003 to 31-March-2004. The scenarios were:

- Conservative substances (no degradation)
- Slowly degrading substances (half-life = 150 days)
- Rapidly degrading substances (half-life = 7 days)

The only difference for each of these runs was the degradation rate of the dye tracer representing the effluent (and associated dissolved phase constituents). The effluent flow and associated effluent solids loading from the Asplund WPCF discharge and the freshwater inflows were the same for all runs.

To summarize the water column model results for each scenario, the Upper CI model was divided into three regions based on beluga migration patterns. The regions, outlined in red, are shown on Figure B-17. Within each of these regions, the water column constituent mass weighted averages were computed for hourly time snapshots. This provides a single representative concentration value for each region for each hour. The following subsections summarize these findings.

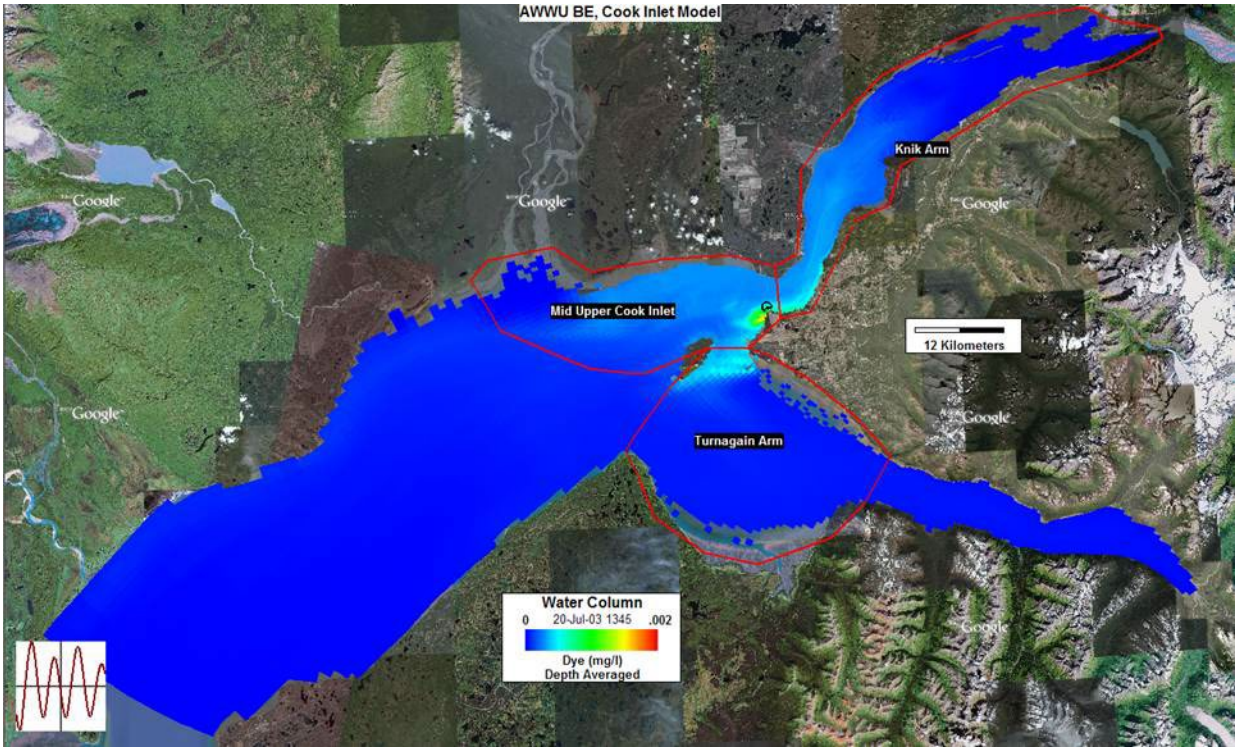


FIGURE B-17. LOCATION OF THE THREE WATER COLUMN SUMMARY REGIONS

B.5.1 Dissolved Constituents

B.5.1.1 No Degradation

Representative snapshots of dye concentration for summer and winter at high tide are displayed on Figures F-18 and F-19, respectively. The tide at the time of the snapshots is shown on the inset for each figure. Dye concentration was lower in summer, when there was a large volume of water flowing from streams. The seasonal trend of dye concentration is displayed on Figure B-20 for the three defined regions. Both Knik Arm and Upper CI have a strong seasonal variation, but this trend was not observed in Turnagain Arm. The reason for this may be the low water depth at the mudflat area between Fire Island and Point Woronzof, restricting flow into Turnagain Arm from the

vicinity of the effluent discharge, as well as the absence of a large river source in Turnagain Arm.

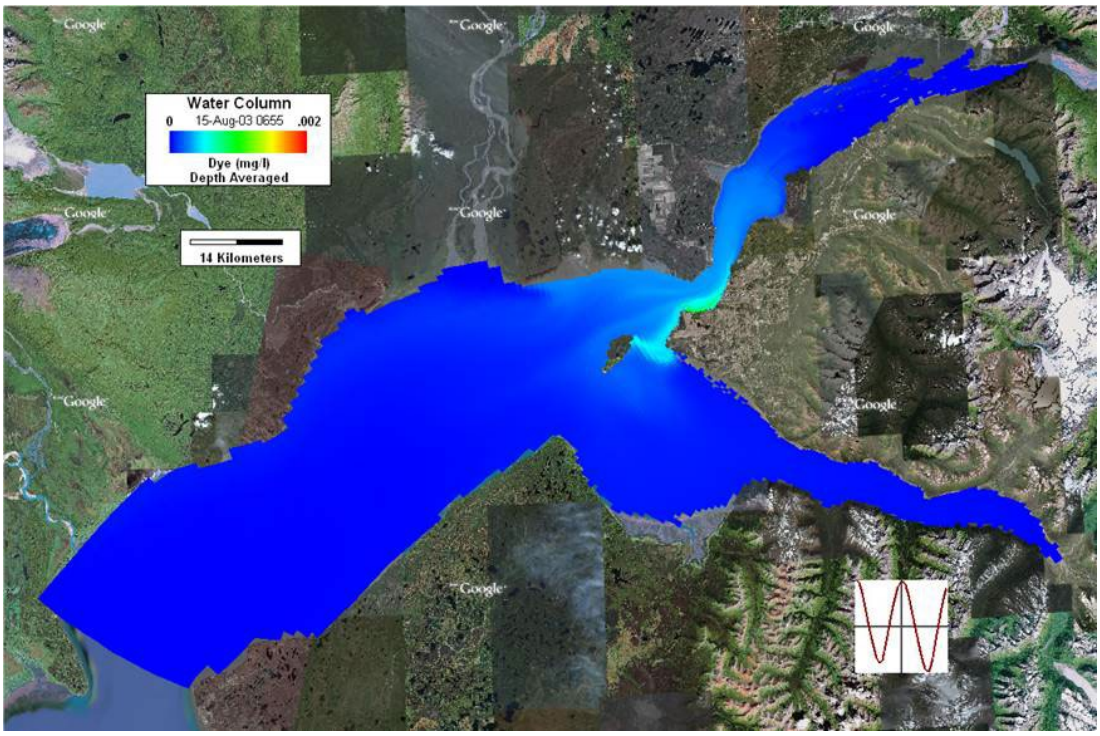


FIGURE B-18. PLAN VIEW OF DYE CONCENTRATION: SUMMER, NO DEGRADATION

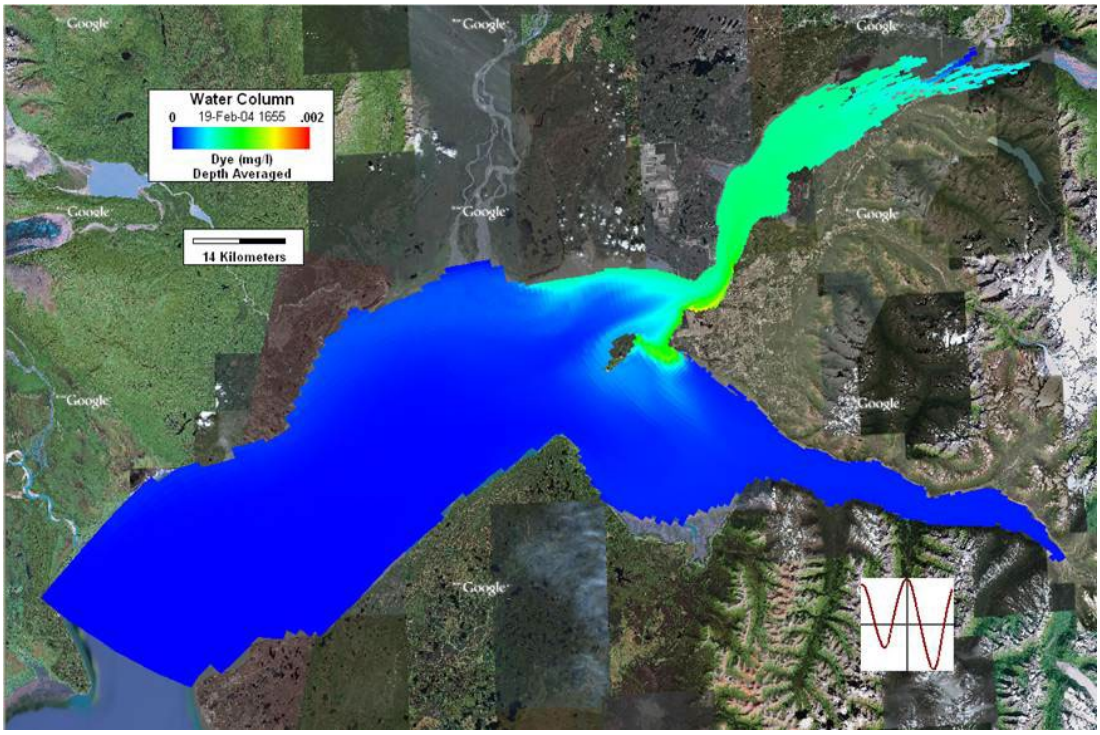


FIGURE B-19. PLAN VIEW OF DYE CONCENTRATION: WINTER, NO DEGRADATION

Figure B-20 is presented in terms of the dye tracer concentration. The dye concentrations are easily interpreted in terms of dilution and concentrations of effluent constituents. The dye-tracer concentration in the effluent was 1 mg/L; therefore, the effluent dilution is the reciprocal of the receiving water dye-tracer concentration[9]. For example, a dye-tracer concentration of 0.0001 represents an effluent dilution of 10,000:1, and a dye-tracer concentration of 0.0008 represents an effluent dilution of 1,250:1. These values represent a dynamic steady-state dilution of the effluent in the water column that includes the buildup of effluent that is not immediately flushed from the water body. The concentration of any effluent constituent in the receiving water is the initial whole effluent concentration divided by the dilution (or times the dye-tracer concentration).

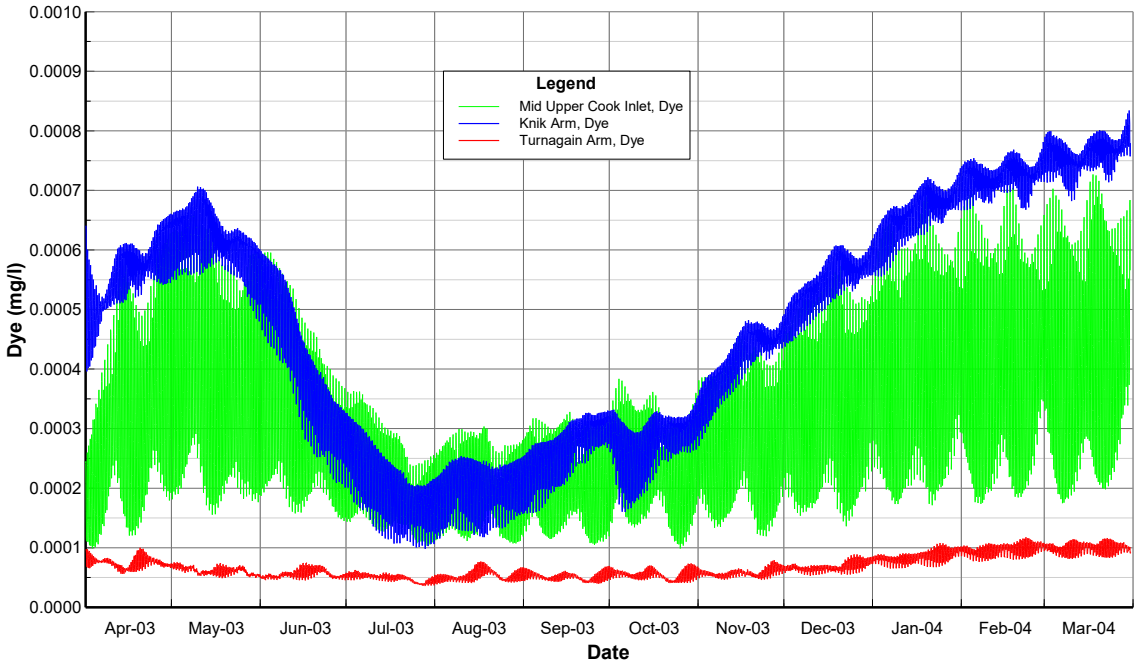


FIGURE B-20. DYE CONCENTRATION TIME-SERIES BASED ON HOURLY SNAPSHOTS FOR EACH REGION: NO DEGRADATION

B.5.1.2 Half Life: 150 Days

The result of the 150 days half-life scenario was similar to results shown for the No Degradation results. The seasonal characteristic of dye concentration can be seen on Figures F-21 through F-23.

B.5.1.3 Half Life: 7 Days

Figures F-24 through F-26 show that, with a short half-life, the dye concentration in all three regions was weakly dependent on flow seasons.

[9] The definition of dilution used here is the ratio of effluent volume to the total water volume (effluent plus receiving water)

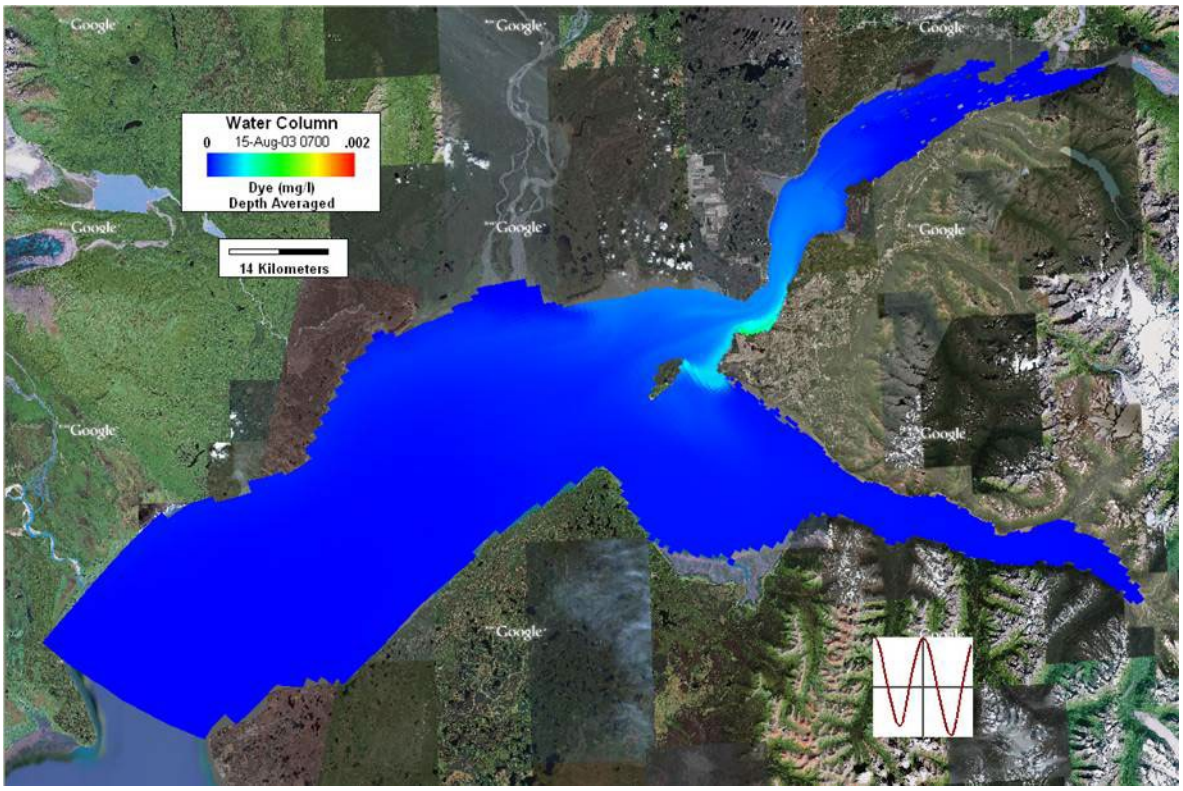


FIGURE B-21. PLAN VIEW OF DYE CONCENTRATION: SUMMER, 150 DAYS HALF LIFE

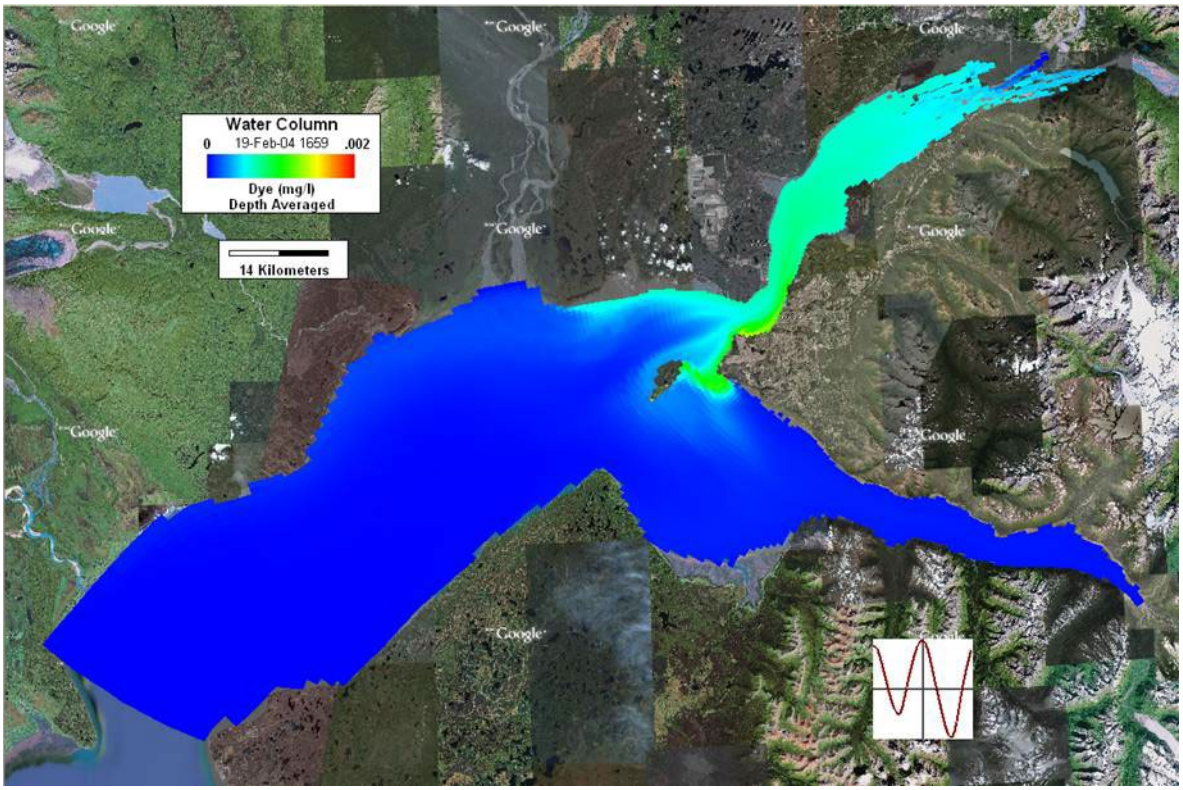


FIGURE B-22. PLAN VIEW OF DYE CONCENTRATION: WINTER, 150 DAYS HALF LIFE

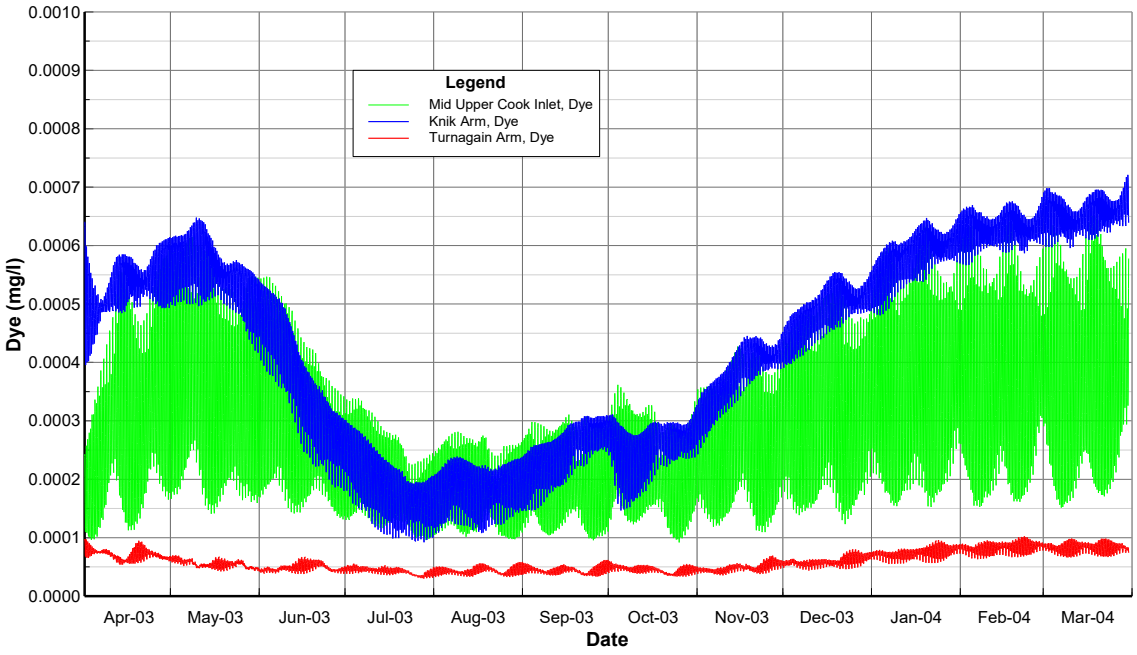


FIGURE B-23. DYE CONCENTRATION TIME SERIES FOR EACH REGION: 150 DAYS HALF LIFE

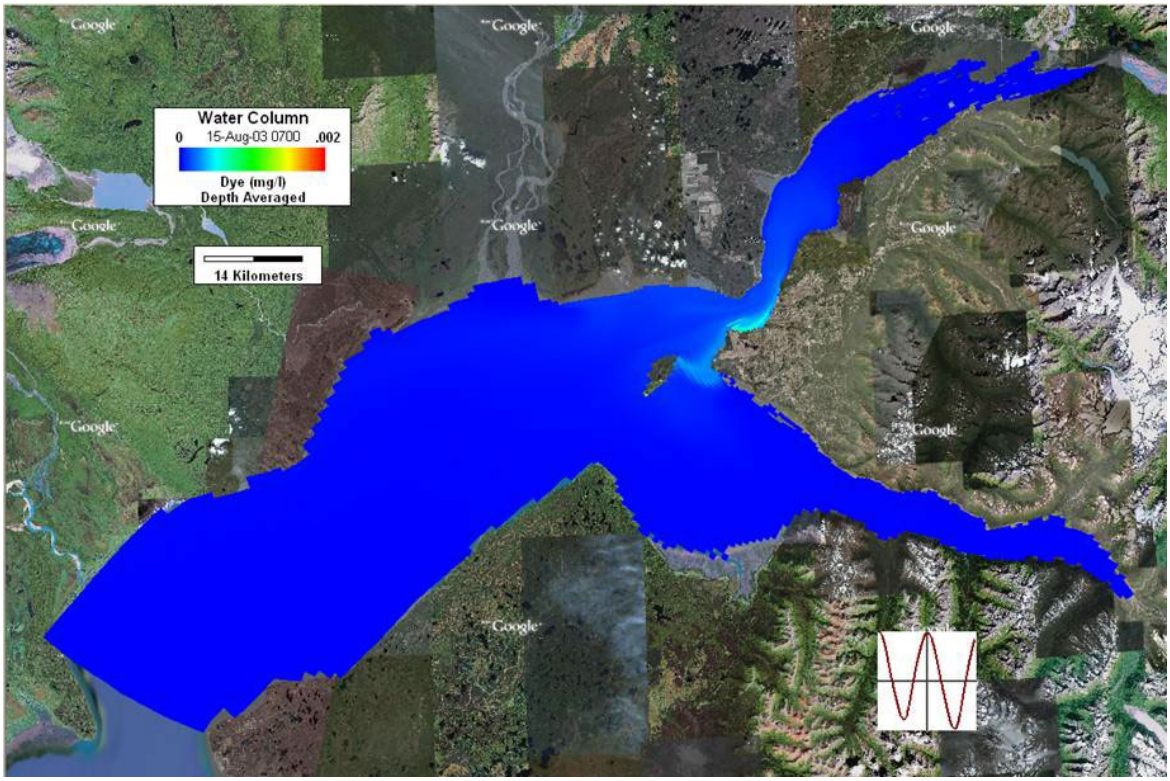


FIGURE B-24. PLAN VIEW OF DYE CONCENTRATION: SUMMER, 7-DAY HALF LIFE

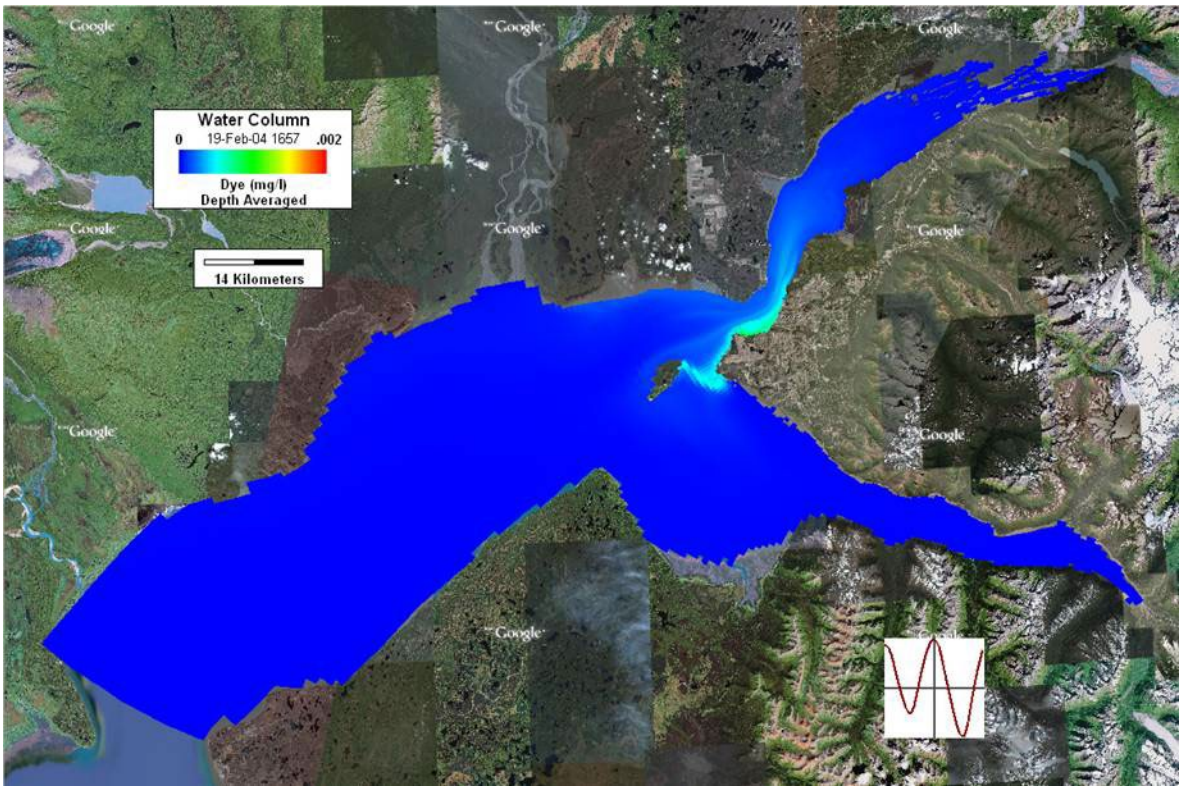


FIGURE B-25. PLAN VIEW OF DYE CONCENTRATION: WINTER, 7-DAY HALF LIFE

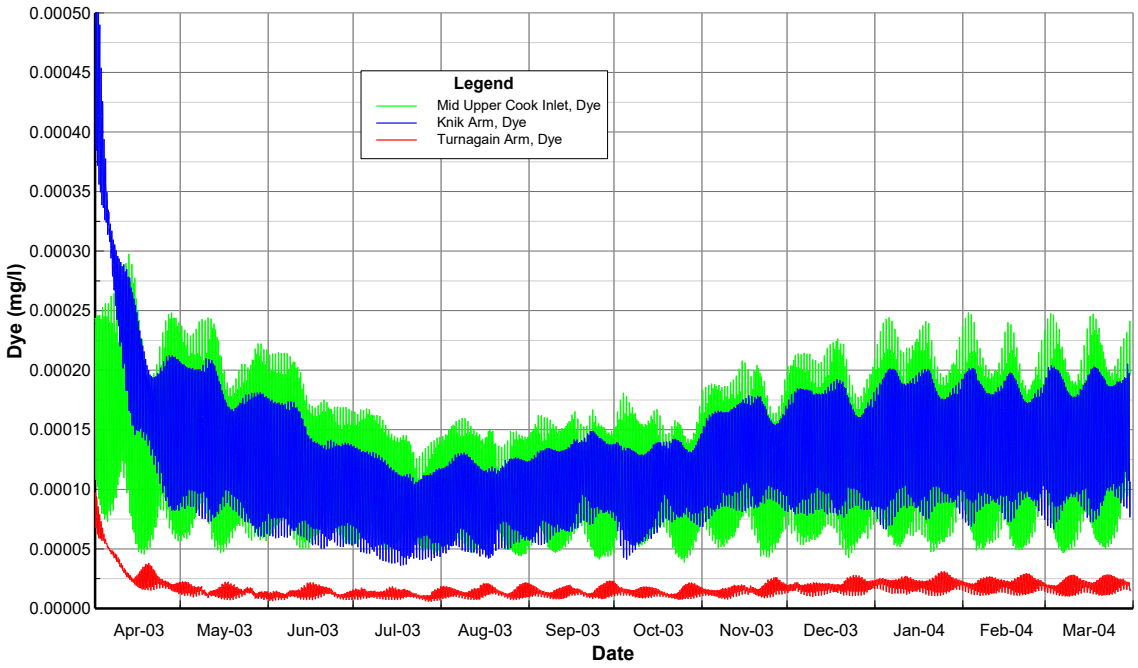


FIGURE B-26. DYE CONCENTRATION TIME SERIES FOR EACH REGION: 7-DAY HALF LIFE

B.5.1.4 Dissolved Phase Comparisons

Comparison of dye-tracer concentration in all three regions indicates that the dye concentration was significantly lower for the 7-day half-life scenario. This can be seen on Figures F-27 through F-29. The concentrations predicted in the water column, using the dye tracer injection of 1 mg/L, were all below 1 part per billion. The winter/summer dilution effects are clearly discernable in all the plots, with the “No Degradation” case being the most pronounced. Turnagain Arm, on average, had the lowest concentrations of the modeled regions, with average concentrations generally below 0.1 part per billion. Table F-6 provides a numerical summary of the average dye concentrations for each month by scenario and region. Attachment B4 provides a more detailed analysis of these results, showing monthly minimums, maximums, and confidence limits.

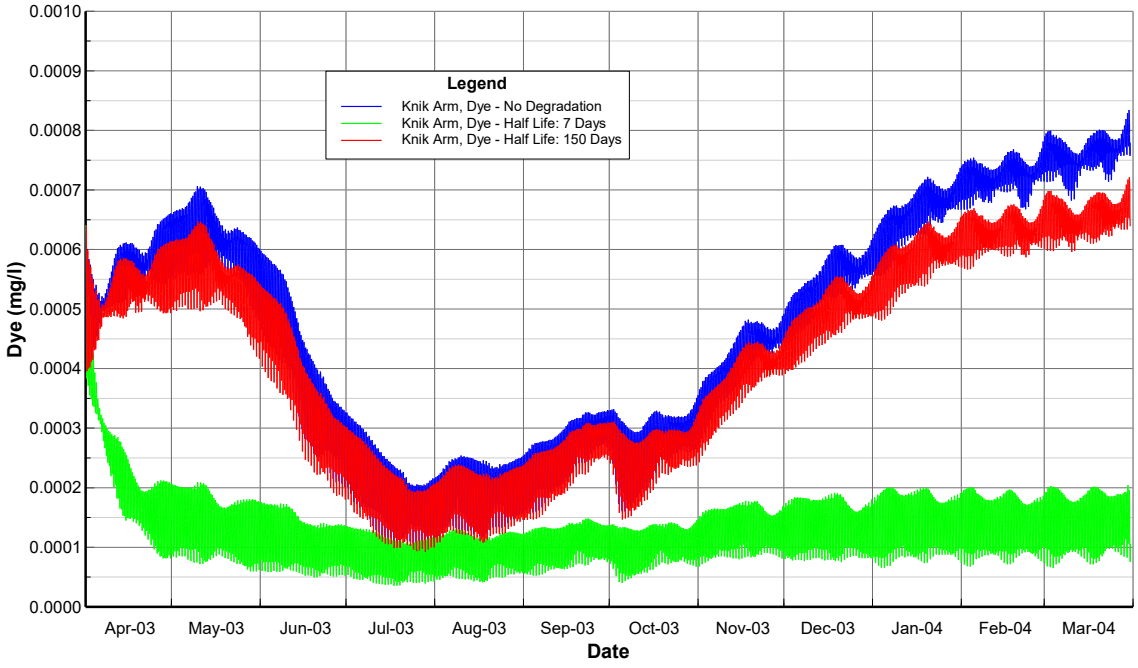


FIGURE B-27. SCENARIO COMPARISON: DYE CONCENTRATION IN KNIK ARM REGION

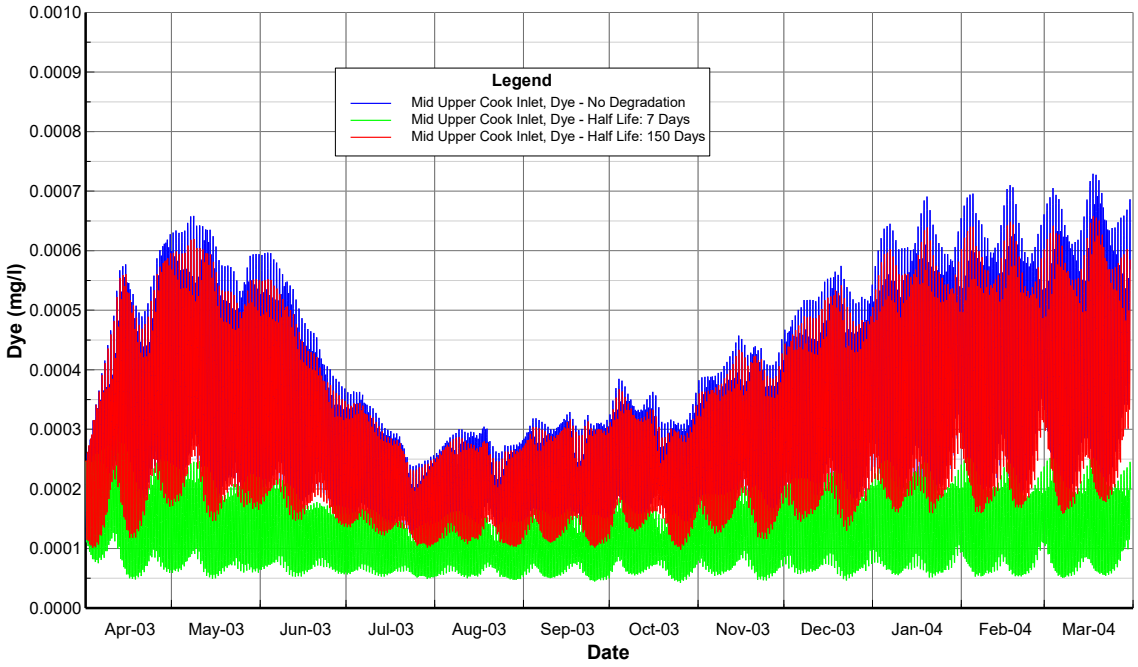


FIGURE B-28. SCENARIO COMPARISON: DYE CONCENTRATION IN MID-UPPER COOK INLET REGION

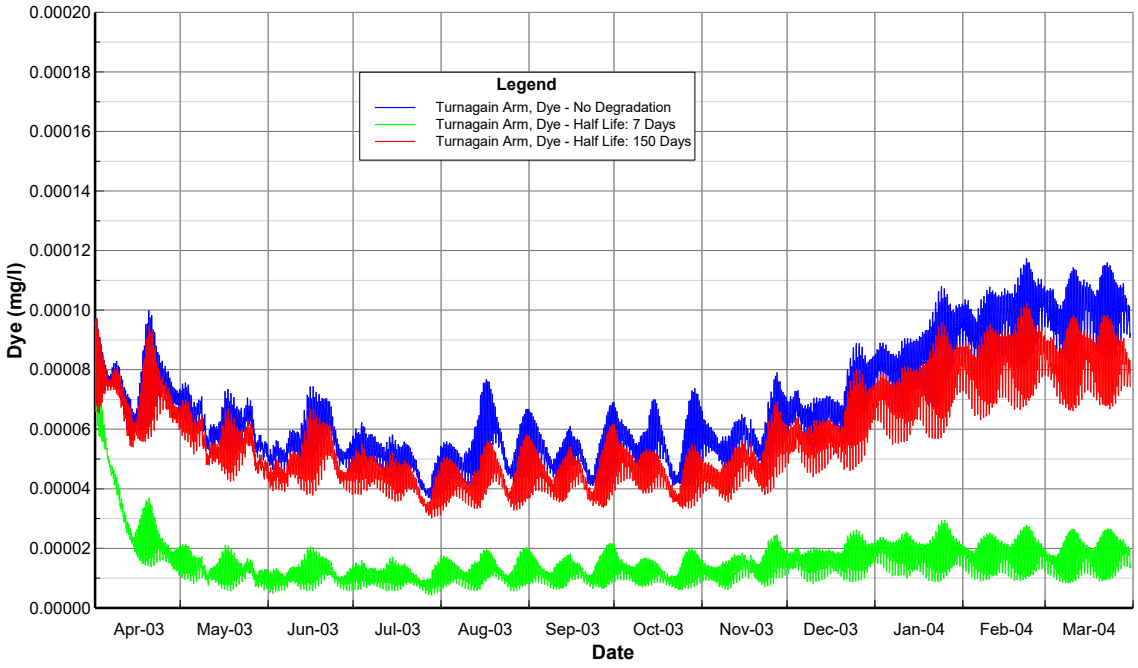


FIGURE B-29. SCENARIO COMPARISON: DYE CONCENTRATION IN TURNAGAIN ARM REGION

Table B-6. Summary of Water Column Concentrations for the Dye Degradation Scenarios

Date	Number of Records	Average Dye-tracer Concentrations (mg/L)								
		No Degradation			Half Life: 150 Days			Half Life: 7 Days		
		Mid-Upper CI	Knik Arm	Turnagain Arm	Mid-Upper CI	Knik Arm	Turnagain Arm	Mid-Upper CI	Knik Arm	Turnagain Arm
3-Apr	720	0.000311	0.000557	0.000075	0.000297	0.000530	0.000071	0.000154	0.000233	0.000032
3-May	744	0.000382	0.000615	0.000062	0.000353	0.000555	0.000055	0.000138	0.000140	0.000013
3-Jun	720	0.000326	0.000413	0.000056	0.000298	0.000369	0.000049	0.000124	0.000112	0.000012
3-Jul	744	0.000213	0.000206	0.000049	0.000199	0.000192	0.000043	0.000101	0.000088	0.000011
3-Aug	745	0.000200	0.000201	0.000053	0.000185	0.000188	0.000043	0.000099	0.000092	0.000012
3-Sep	720	0.000213	0.000268	0.000051	0.000199	0.000251	0.000044	0.000103	0.000108	0.000012
3-Oct	743	0.000236	0.000282	0.000054	0.000217	0.000260	0.000045	0.000107	0.000106	0.000012
3-Nov	720	0.000275	0.000415	0.000058	0.000256	0.000379	0.000049	0.000121	0.000131	0.000014
3-Dec	744	0.000336	0.000543	0.000068	0.000310	0.000490	0.000060	0.000130	0.000137	0.000017
4-Jan	744	0.000395	0.000659	0.000085	0.000360	0.000583	0.000074	0.000138	0.000143	0.000019
4-Feb	696	0.000406	0.000723	0.000097	0.000365	0.000630	0.000083	0.000134	0.000142	0.000018
4-Mar	720	0.000423	0.000761	0.000099	0.000375	0.000654	0.000083	0.000137	0.000146	0.000017

B.5.1.5 Nikiski Boundary Dye Flux

As described above, the EFDC open boundary was set a sufficient distance south in Cook Inlet from the critical habitat area of interest to avoid significant or meaningful tidal reflux effects. To validate this approach, an analysis of dye-tracer flux (and thus effluent) leaving the model domain at the downstream boundary, located near the Forelands, was conducted. Figure B-30 plots the dye mass leaving the model domain at the open boundary (the flux signs indicate direction only). Although there is definitely a flux of dye out of the model domain, the corresponding concentrations in the water leaving the model were generally on the order of 10^{-6} mg/L or lower (i.e., one to two orders of magnitude lower than the concentrations in the area of interest). This analysis clearly demonstrates that the model domain was sufficient to evaluate the Asplund WPCF effluent concentrations within the designated critical habitat area.

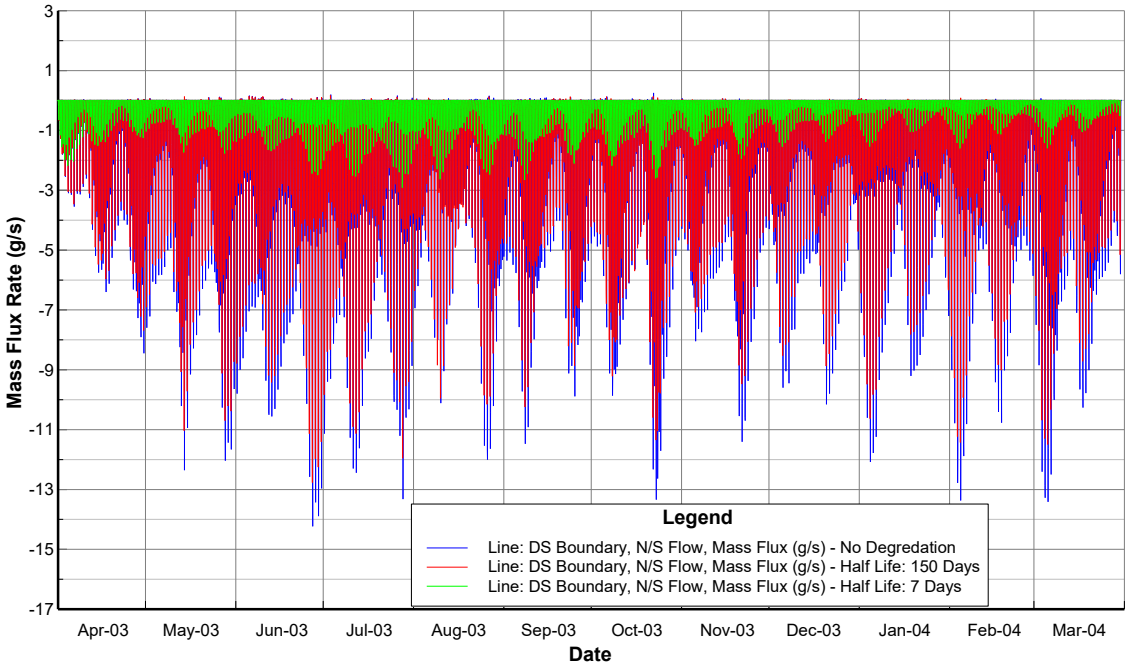


FIGURE B-30. SCENARIO COMPARISON: DYE MASS FLUX LEAVING DOMAIN AT DOWNSTREAM BOUNDARY (WHERE POSITIVE VALUES ARE NORTHWARD AND NEGATIVE VALUES ARE SOUTHWARD)

B.5.2 Suspended Solids

The TSS concentrations for the Asplund WPCF sediment classes (TSS_{AWWU}) for each region are plotted on Figure B-31. The figure clearly shows that the AWWU fraction of solids in the Upper CI is well below 1/10,000 of the total solids in the water column. Table B-7 summarizes the TSS_{AWWU} mass fraction in the water column by month and region.

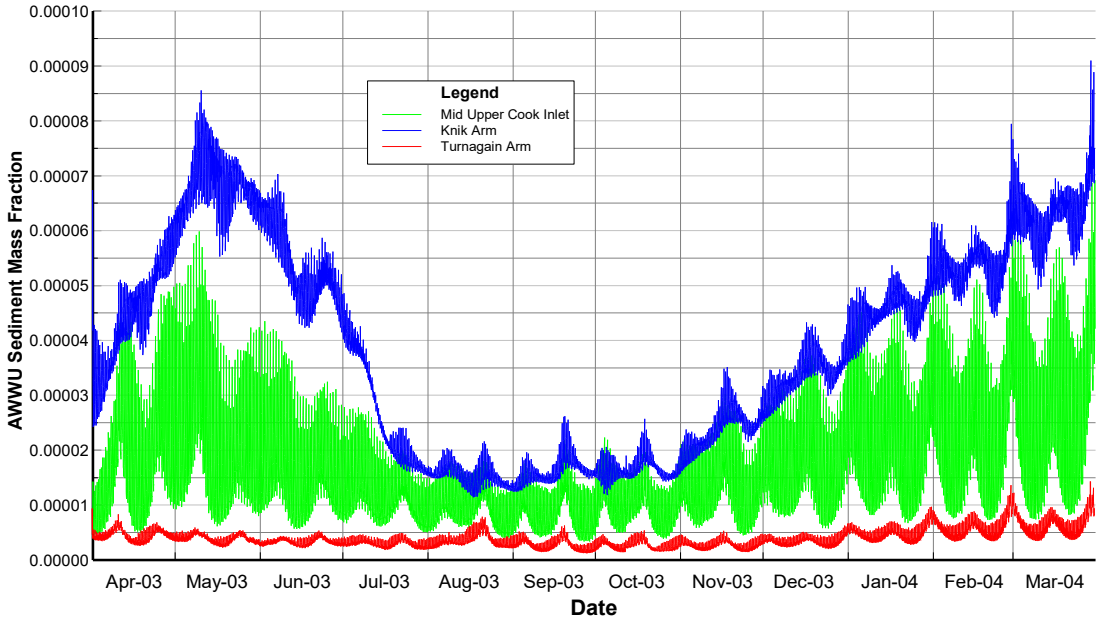


FIGURE B-31. TIME SERIES OF AWWU SUSPENDED SEDIMENT MASS FRACTION BY REGION

Table B-7. Water Column Concentration Summary: AWWU Suspended Solids Mass Fraction

		Average AWWU Mass Fractions by Region		
Date	Number of Records	Knik Arm (%)	Mid-Upper CI (%)	Turnagain Arm (%)
3-Apr	720	0.0000436	0.0000168	0.0000048
3-May	744	0.0000680	0.0000198	0.0000043
3-Jun	720	0.0000527	0.0000159	0.0000038
3-Jul	744	0.0000259	0.0000122	0.0000035
3-Aug	745	0.0000154	0.0000097	0.0000040
3-Sep	720	0.0000161	0.0000086	0.0000030
3-Oct	743	0.0000166	0.0000102	0.0000031
3-Nov	720	0.0000234	0.0000128	0.0000032
3-Dec	744	0.0000335	0.0000167	0.0000039
4-Jan	744	0.0000454	0.0000202	0.0000052
4-Feb	696	0.0000538	0.0000213	0.0000060
4-Mar	720	0.0000635	0.0000239	0.0000065

B.5.3 Sediment Deposition

After 1 year of simulation, the total sediment deposition (natural plus effluent-derived) may reach as much as 3 meters at certain limited locations shown on Figure B-32. These locations are typically in shallow water on or adjacent to the mud flats. The deposition over most of the study area is negligible.

Most Asplund WPCF sediment deposition occurred at shallow locations, as shown on Figure B-33. The greatest thickness was about 0.001 meter at the mudflat between Fire Island and Point Woronzof, as well as at some locations near both banks of upper Knik Arm.

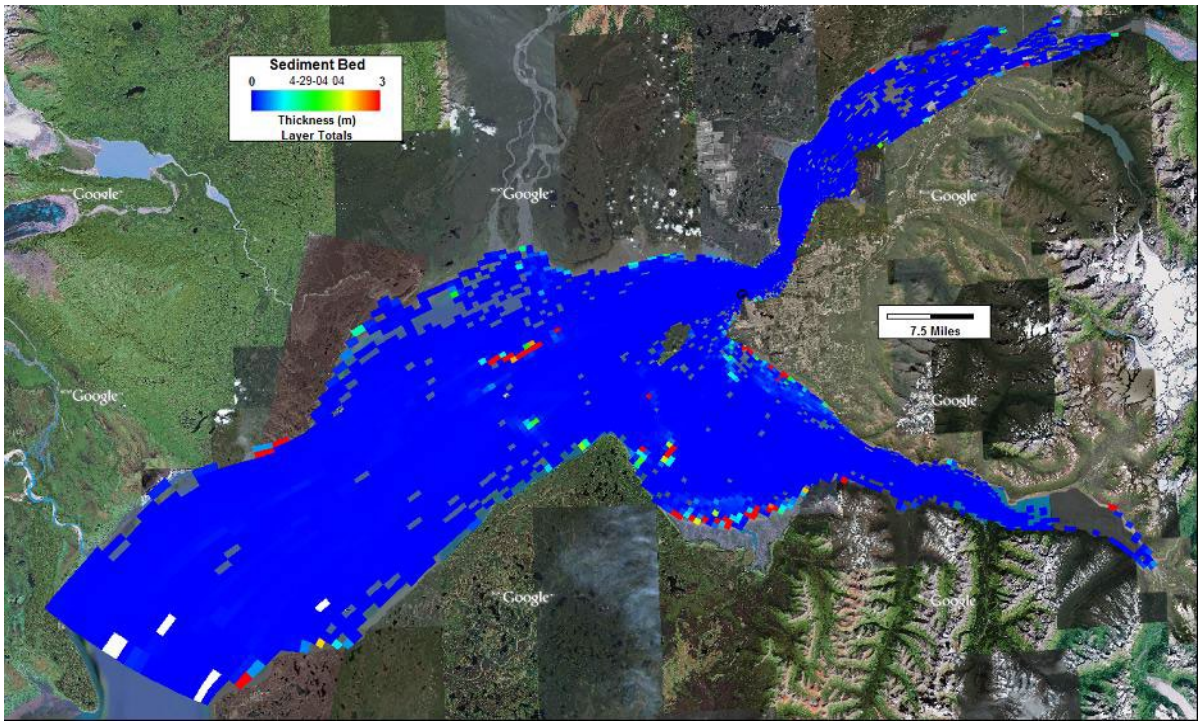


FIGURE B-32. TOTAL SEDIMENT DEPOSITION MAP AFTER 1 YEAR: TOTAL SEDIMENT THICKNESS

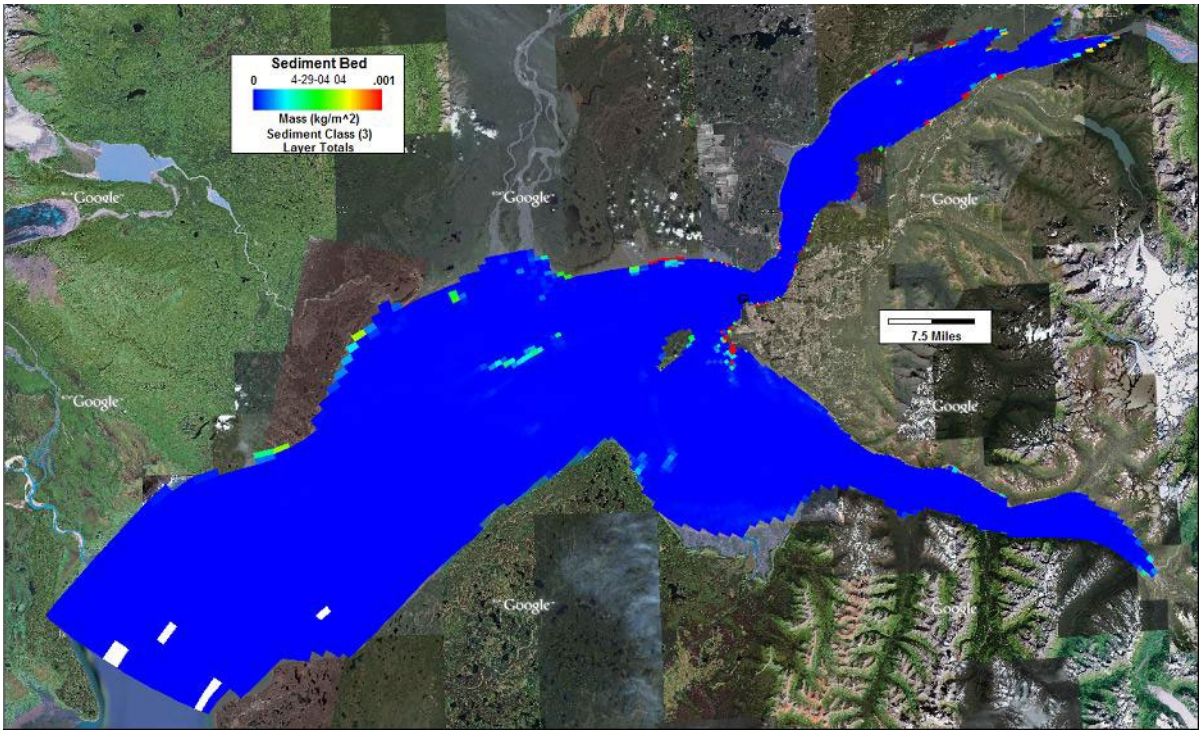


FIGURE B-33. SEDIMENT DEPOSITION MAP AFTER 1 YEAR: NON-COHESIVE CLASS 1 (AWWU MARKER CLASS) SEDIMENT MASS

B.6 Conclusions

The following summarizes the results of the modeling study:

- A 3D hydrodynamic/transport EFDC model was developed for Upper CI.
- The model was calibrated against available data, which indicated that the model simulations are realistic, accurate, and appropriate for the purposes of this BE.
- The model simulations reproduce the general circulation and transport patterns of the Upper CI and provide a sound technical basis to evaluate the transport and distribution of Asplund WPCF discharge constituents in the modeled area.
- The model results clearly show the geographic and seasonal variability of effluent distribution. The effects of degradation on the distribution of effluent constituents were clearly demonstrated.
- The model-predicted concentrations of a dye-tracer and effluent-derived TSS were extremely low as follows:
  - Average dilutions of whole effluent over the modeled regions range from over 1,000:1 to approximately 20,000:1 for conservative substances that do not degrade rapidly with time.

- The concentration of effluent-derived suspended sediments is more than six orders of magnitude smaller than the concentration of natural sediments.
- The deposition of effluent-derived sediments will occur in only limited areas and comprise an extremely small fraction of the total sediment deposits.

- The model will be used as the basis for predicting distribution and concentration of POCs in the Asplund WPCF effluent.

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Attachment B1
EFDC Description

ATTACHMENT B1

EFDC Description

Governing Physics of EFDC

The EFDC hydrodynamic model is a variable-density, unsteady-flow model that uses the Boussinesq approximation, hydrostatic pressure field, and internal solutions of vertical eddy viscosity and diffusivity. The EFDC model solves the vertically hydrostatic, free-surface, turbulent-averaged equations of motions for a variable density fluid.

Dynamically-coupled transport equations for turbulent kinetic energy, turbulent length scale, salinity, and temperature are solved. The two turbulence parameter transport equations implement the Mellor-Yamada level '2.5' turbulence closure scheme (Mellor and Yamada, 1982; Galperin et al., 1988). The bottom stress formulation for friction, accounting for the rate of momentum loss at the sediment bed/water interface, is represented using a turbulent boundary layer formulation based on a quadratic function of near-bottom velocity. Water temperature is solved as an integral part of the hydrodynamic model, with heat transport simulated using the atmospheric heat exchange model developed by Rosati and Miyakoda (1988), in which solar radiation at the water surface is reduced as a function of depth in the water column.

The state equations and numerical solution methods used in the EFDC hydrodynamic model are given in Hamrick (1992; 1996), Blumberg and Mellor (1987), and Martin and McCutcheon (1999). The interested reader is referred to these sources since the equations of the model are not presented in this report.

Numerical Solution Schemes of EFDC

The spatial domain of a water body can be represented in EFDC using (a) Cartesian, or curvilinear orthogonal coordinates in the horizontal (x,y) domain; and (b) a stretched, or sigma, coordinate scheme in the vertical (z) domain. The numerical scheme used in EFDC to solve the equations of motion uses a second-order accurate, spatial finite difference scheme on a staggered or C grid. The model's time integration uses a second-order accurate, two time-level, finite difference scheme, with an internal/external mode splitting procedure to separate the internal shear from the external free surface gravity wave. The external mode solution is semi-implicit and simultaneously computes the two-dimensional surface elevation field by a preconditioned conjugate gradient procedure. The external solution is completed by the calculation of the depth-averaged velocities using the new surface elevation field. The model's semi-implicit external solution allows large time steps that are constrained only by the stability criteria of the explicit central difference or high-order upwind advection scheme (Smolarkiewicz and Margolin, 1993) used for the nonlinear accelerations.

Horizontal boundary conditions for the external mode solution include options for simultaneously specifying the surface elevation only, the characteristic of an incoming wave (Bennett and McIntosh, 1982), free radiation of an outgoing wave (Bennett, 1976;

Blumberg and Kantha, 1985), or the normal volumetric flux on arbitrary portions of the boundary. The EFDC model's internal momentum equation solution, at the same time step as the external solution, is implicit with respect to vertical diffusion. The internal solution for the momentum equations is defined in terms of the vertical profile of shear stress and velocity shear. Time-splitting inherent in the two time-level scheme is controlled by periodic insertion of a second-order accurate two-time level trapezoidal step. In addition to the general 3D (x,y,z) spatial domain, the EFDC model can also be readily configured as a two-dimensional model in either the horizontal (2D: x,y) or vertical (2D: x,z) planes.

The EFDC model implements a second-order accurate in space and time, mass conservation fractional-step solution scheme for the Eulerian transport equations for salinity, temperature, suspended sediment, water quality constituents, and toxic contaminants. The transport equations are temporally integrated at the same time step or twice the time step of the momentum equation solution (Smolarkiewicz and Margolin, 1993). The advective step of the transport solution uses either the central difference scheme used in the Blumberg-Mellor (1987) model or a hierarchy of positive definite upwind difference schemes. The highest accuracy upwind scheme, second-order accurate in space and time, is based on a flux-corrected transport version of Smolarkiewicz's multidimensional positive definite advection transport algorithm (Smolarkiewicz and Clark, 1986; Smolarkiewicz and Grabowski, 1990), which is monotonic and minimizes numerical diffusion. The horizontal diffusion step, if required, is explicit in time, while the vertical diffusion step is implicit. Horizontal boundary conditions include time-variable material inflow concentrations, upwind outflow, and a damping relaxation specification of climatological boundary concentrations.

Enhancements to EFDC

The version of EFDC used for this project incorporates a number of enhancements to the base EPA EFDC code[10]. These enhancements have been made to assist model development and application. Key enhancements to the EFDC code include the following:

- Dynamic memory allocation allows the user to use the same executable code for applications to different water bodies. This eliminates the need to re-compile the EFDC code for different applications because of different maximum array sizes required to specify the computational grid domain and time series input data sets. Dynamic allocation also helps prevent inadvertent errors and provides better traceability for source code development.
- Lagrangian particle tracking, with particle inputs assuming neutrally buoyant/zero mass particles or fixed depth drogues.
- Wind-generated wave bed shear stress.
- Enhanced heat exchange options that use equilibrium temperatures for the water and atmospheric interface and spatially variable sediment bed temperatures.

[10] (www.epa.gov/ceampubl/swater/efdc/index.htm)

- New output snapshot controls for targeting specific periods for high frequency output within the standard regular output frequency.
- Streamlining the code for quicker execution times.
- Customizing linkage of model results for the Windows-based EFDC_Explorer graphical pre- and post-processor.

State Variables and Computed Output Variables of EFDC

Hydrodynamic models simulate velocity and transport fields, elevation of the free water surface, and bottom stress. The EFDC state variables include stage height or free water surface elevation, salinity, water temperature, and velocity. A three-dimensional application of EFDC simulates velocity in three-dimensions (x,y,z) as the 'u' and 'v' horizontal (x,y) components and the 'w' vertical (z) component. Turbulent kinetic energy and turbulent macroscale length scale parameters are also included as state variables. Water density is computed as a function of water temperature and salinity. EFDC computes horizontal diffusivity as an output variable of the model from horizontal turbulent closure methods. EFDC also computes vertical eddy viscosity and vertical eddy diffusivity from vertical turbulence closure schemes as output variables of the model.

EFDC_Explorer Description

The availability and capabilities of pre- and post-processing tools are critical to cost-effective and successful setup, calibration, and application of an EFDC model. The EFDC_Explorer pre- and post-processor is Windows-based graphical user interface (GUI) public-domain software designed to support model setup, Cartesian and curvilinear grid generation, testing, calibration, and data visualization, including plots and animation of model results (Craig, 2008). EFDC_Explorer currently supports the following EFDC applications:

- Hydrodynamics
- Density dependent flow state variables: i.e., salinity and temperature
- Sediment transport (including the latest SEDFlume implementation)
- Particle/drogue tracks
- Toxics
- Water quality with sediment diagenesis
- Tracers

EFDC_Explorer is currently being used by EPA, USGS, USACE, Oklahoma Department of Environmental Quality, Texas Commission on Environmental Quality, Southwest Florida Water Management District, St. Johns River Water Management District, Suwannee River Water Management District, and private consulting firms in the US and other countries.

Attachment B2
Boundary Condition Time Series

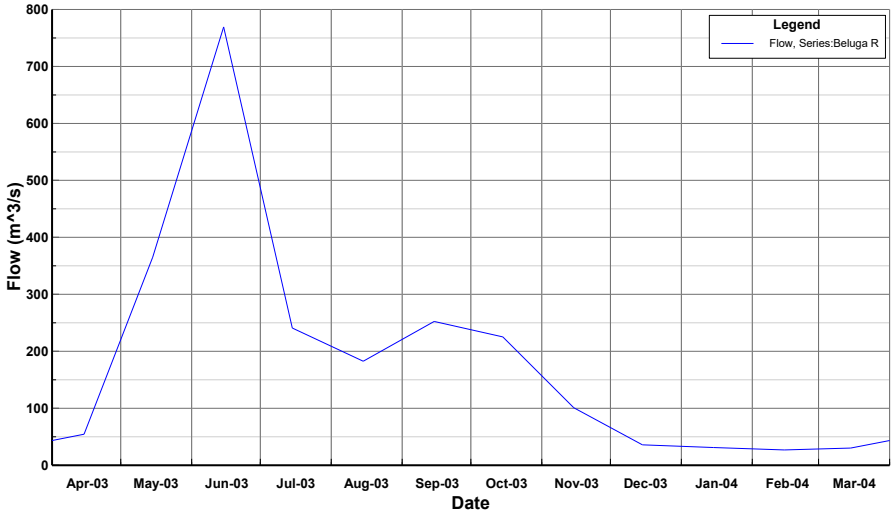


Figure II-1: BC_Flow_Beluga

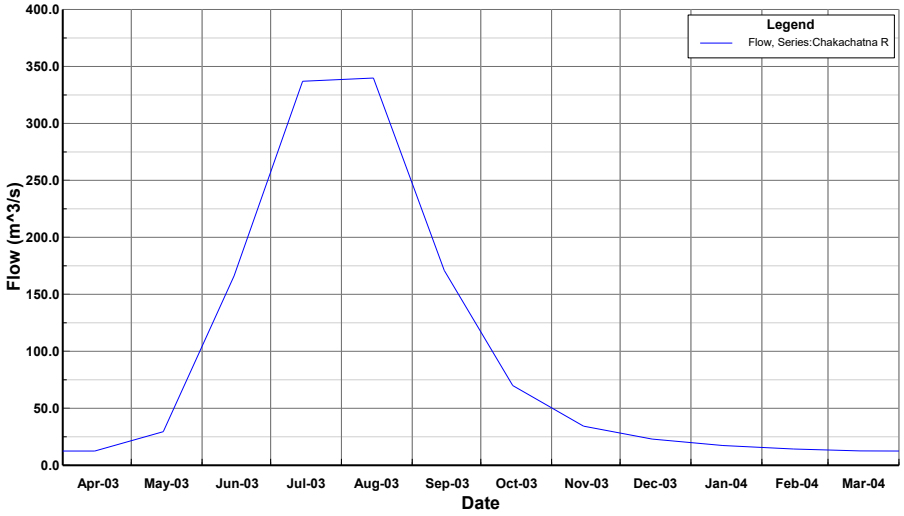


Figure II-2: BC_Flow_Chakachatna R

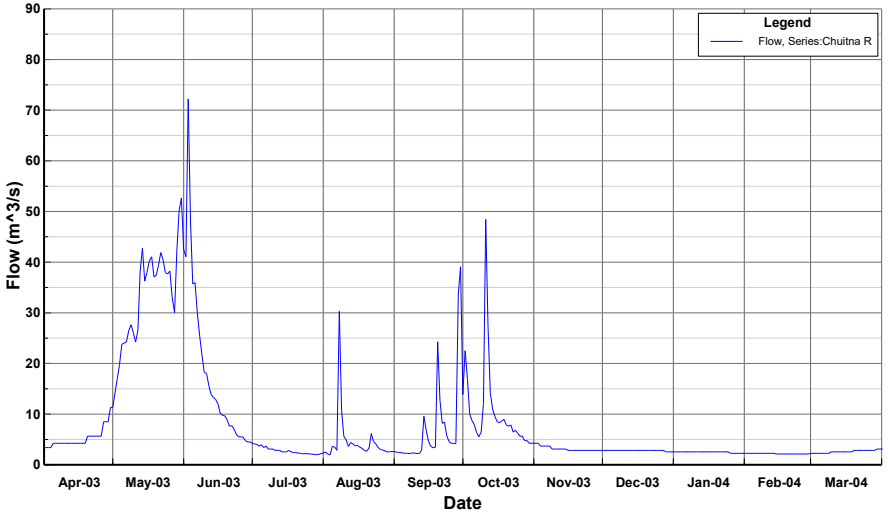


Figure II-3: BC_Flow_Chuitna R

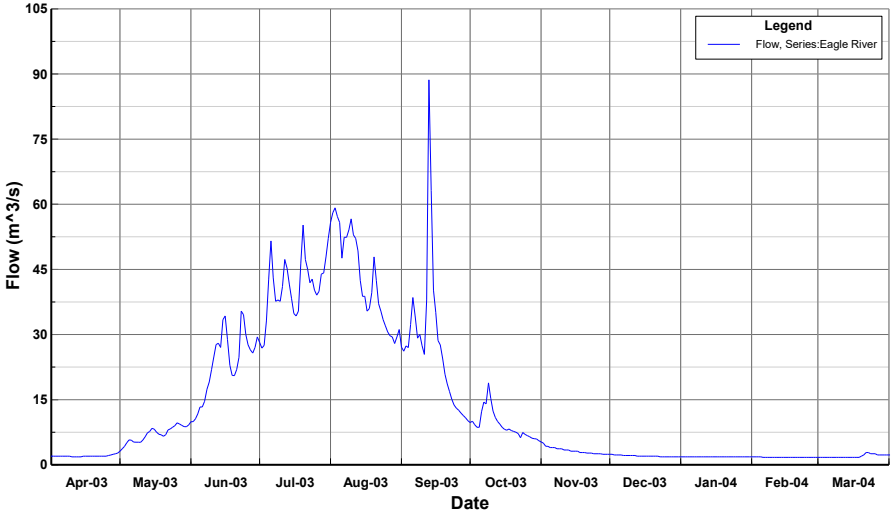


Figure II-4: BC_Flow_Eagle R

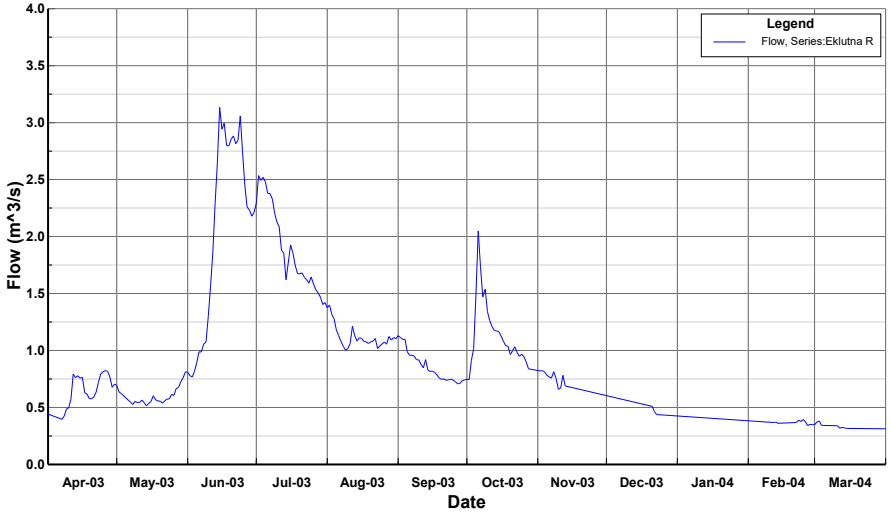


Figure II-5: BC_Flow_Eklutna R

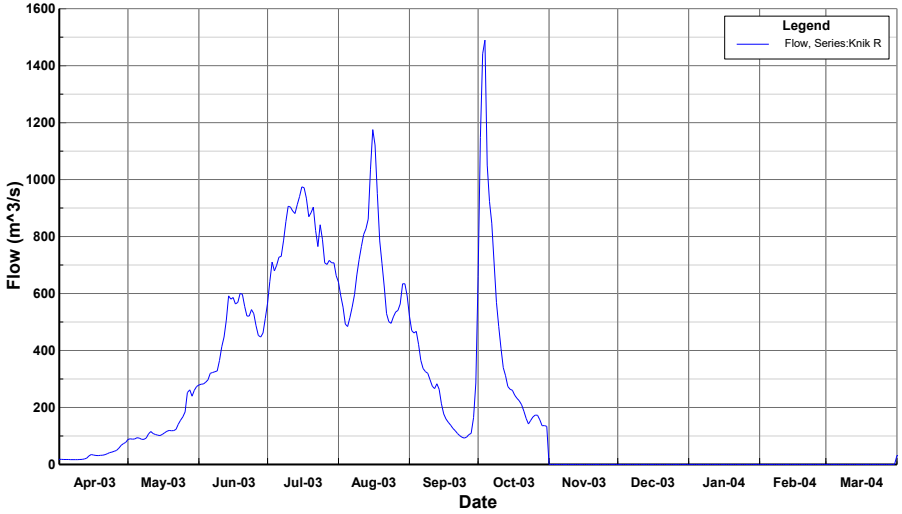


Figure II-6: BC_Flow_Knik R

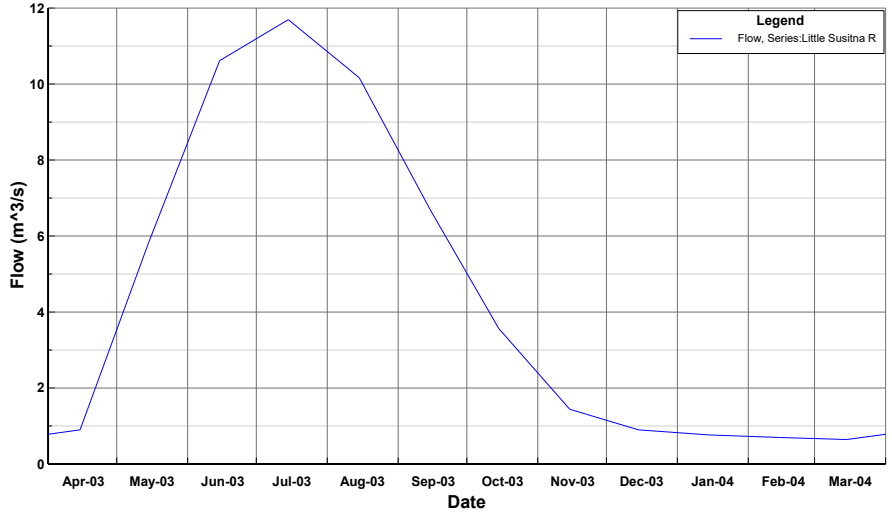


Figure II-7: BC_Flow_Little Susitna R

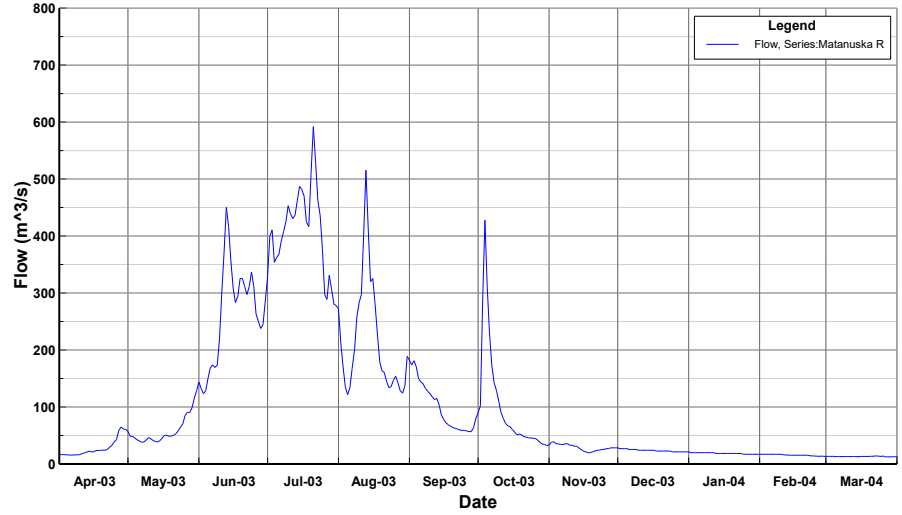


Figure II-8: BC_Flow_Matanuska R



Figure II-9: BC_Flow_Peters Creek

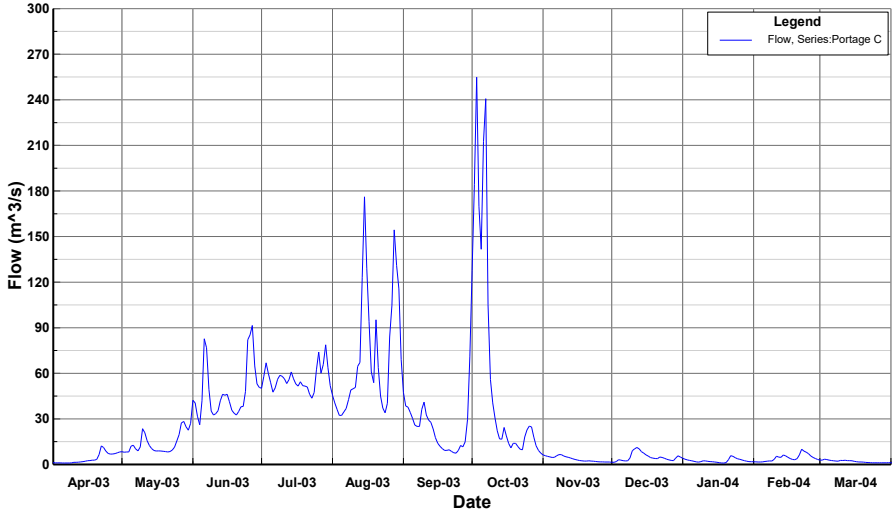


Figure II-10: BC_Flow_Portage C

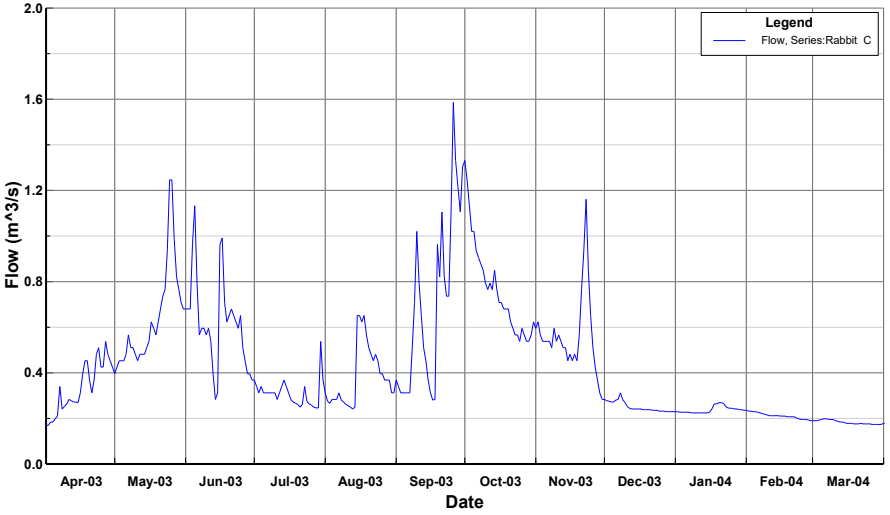


Figure II-11: BC_Flow_Rabbit C

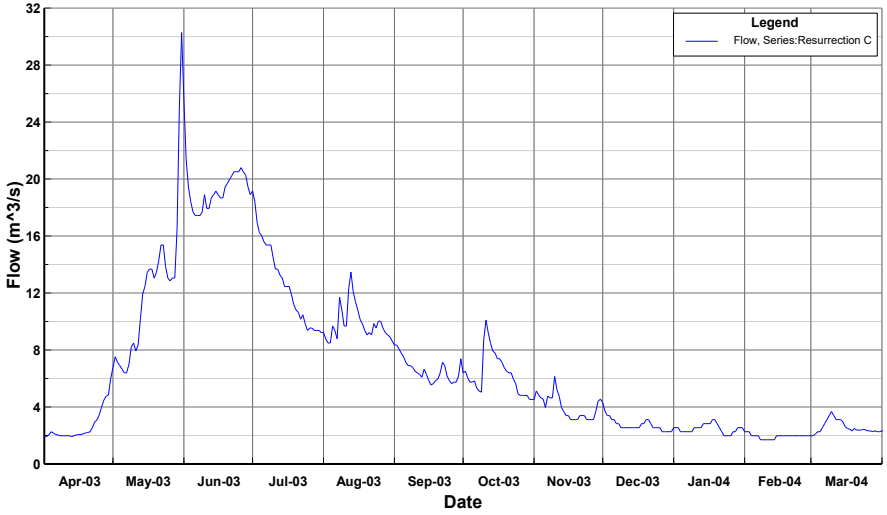


Figure II-12: BC_Flow_Resurrection C

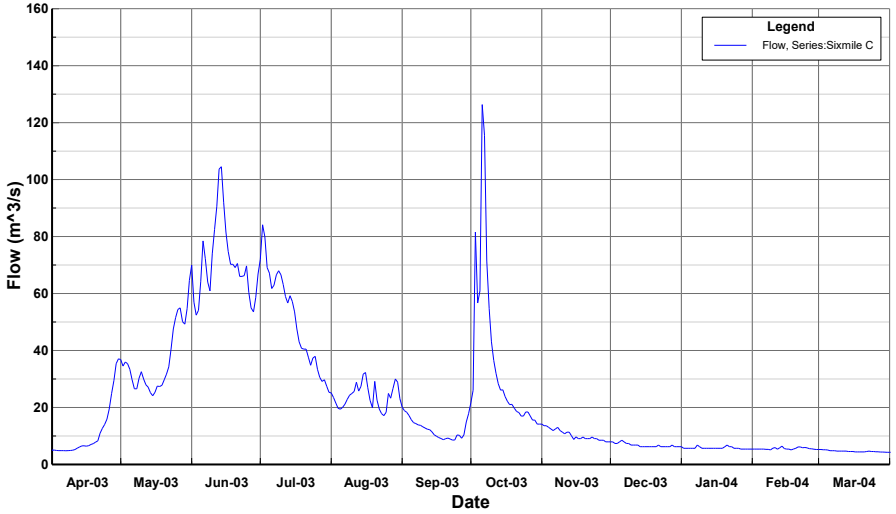


Figure II-13: BC_Flow_Sixmile C

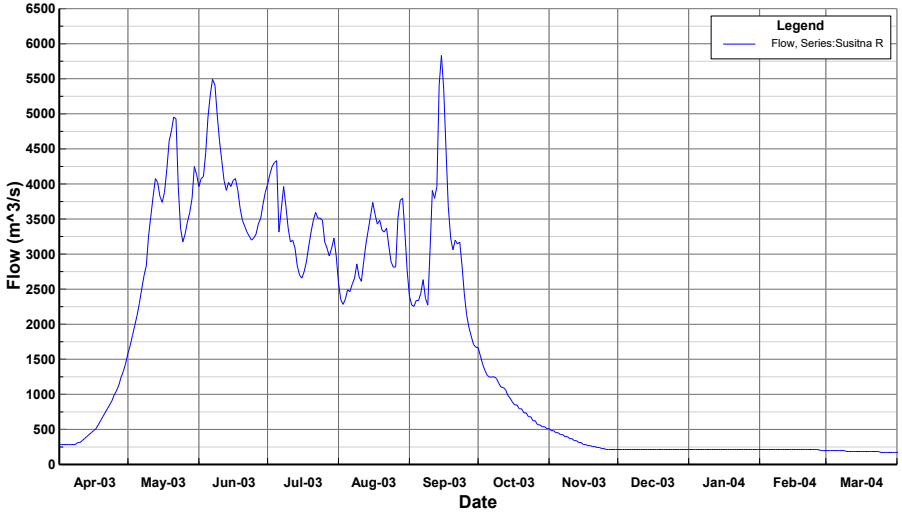


Figure II-14: BC_Flow_Susitna R

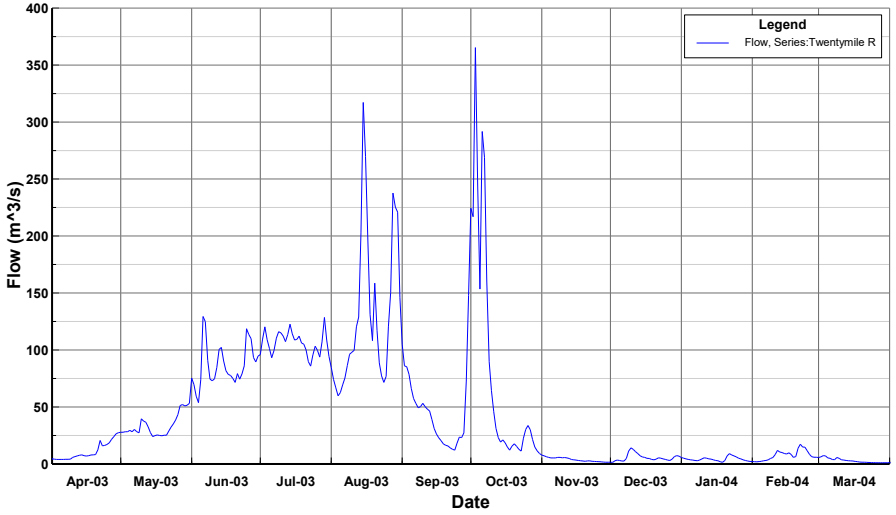


Figure II-15: BC_Flow_Twentymile R

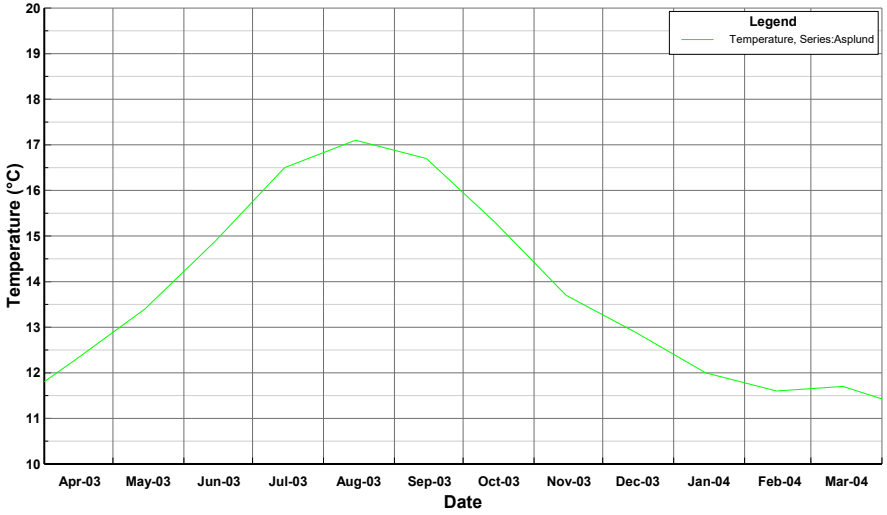


Figure II-16: Temperature_Asplund

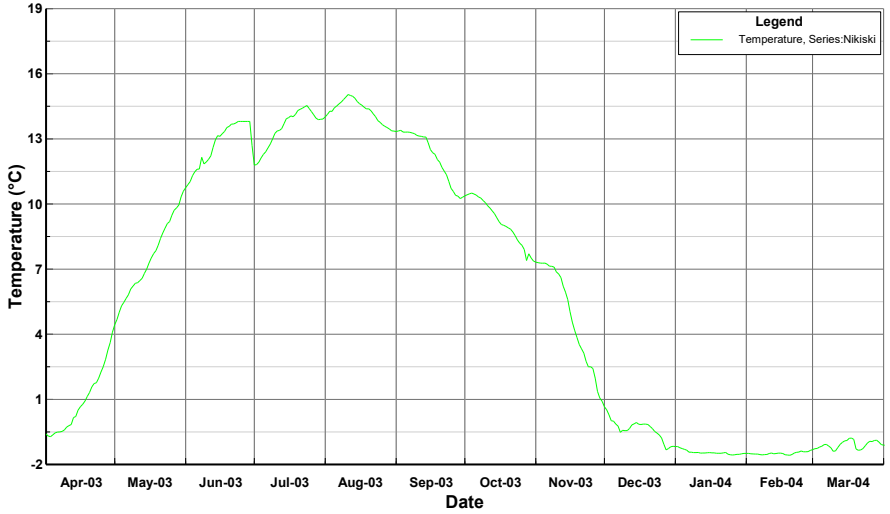


Figure II-17: Temperature_Nikiski

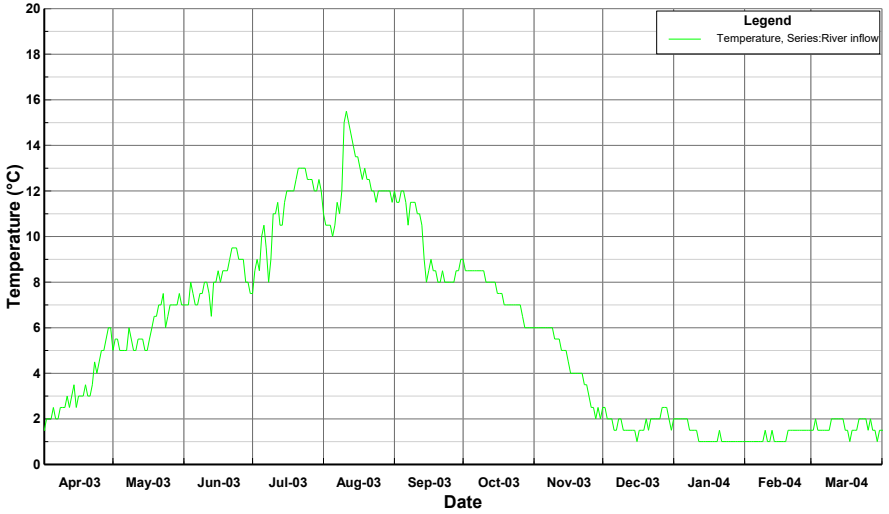


Figure II-18: Temperature_River inflow

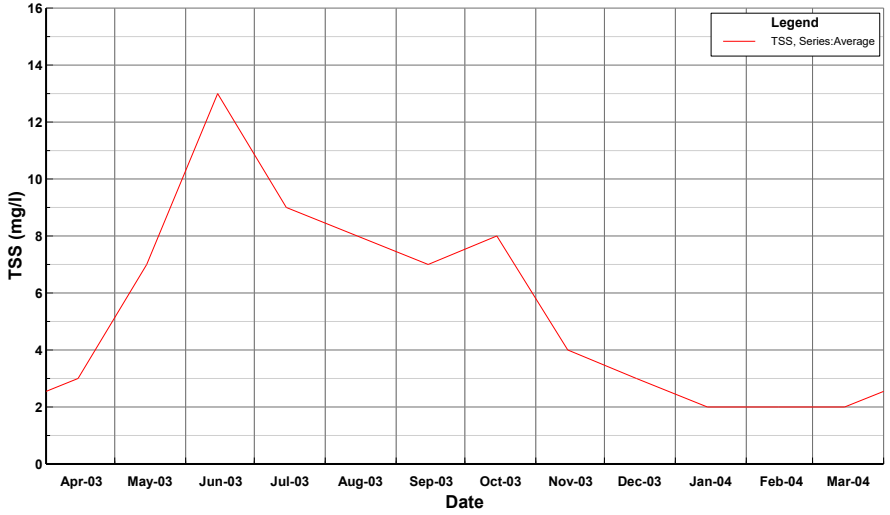


Figure II-19: TSS_Average

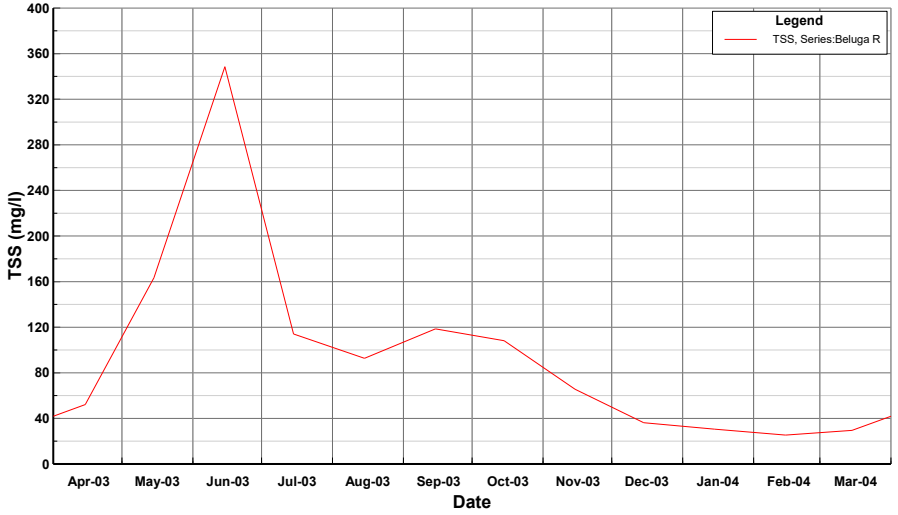


Figure II-20: TSS_Beluga R

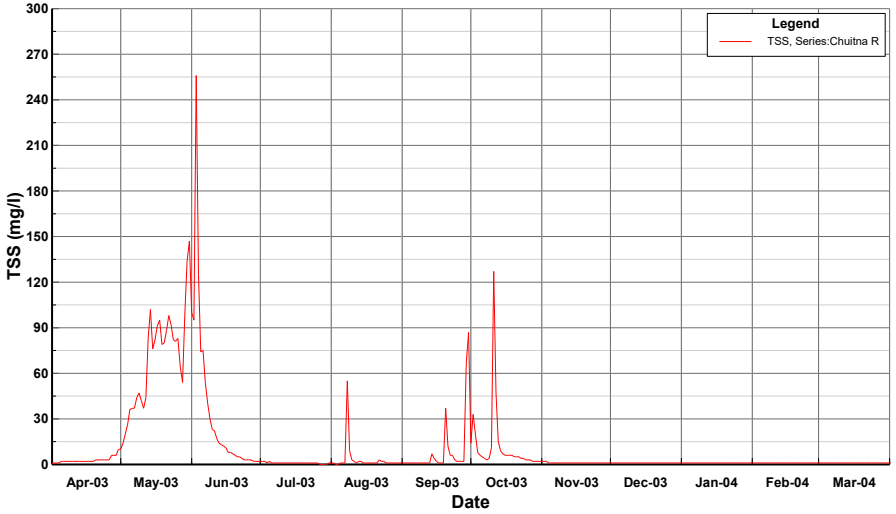


Figure II-21: TSS_Chuitna R

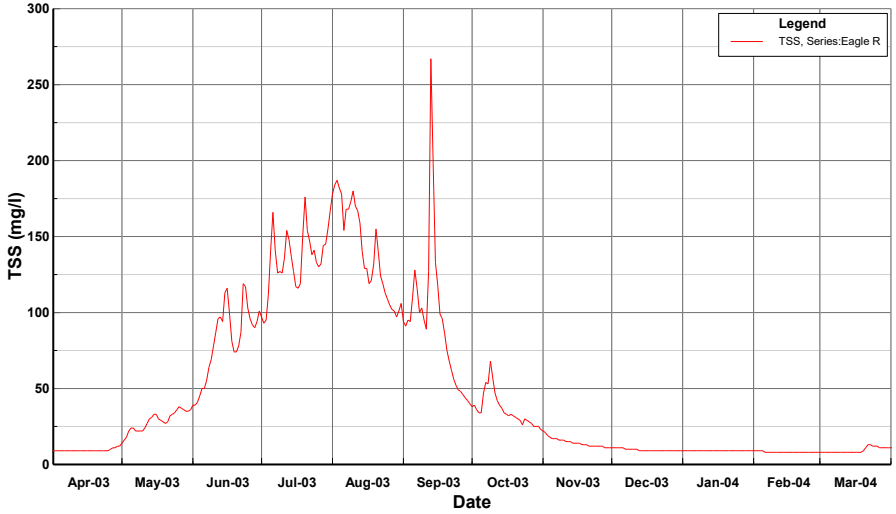


Figure II-22: TSS_Eknutna R

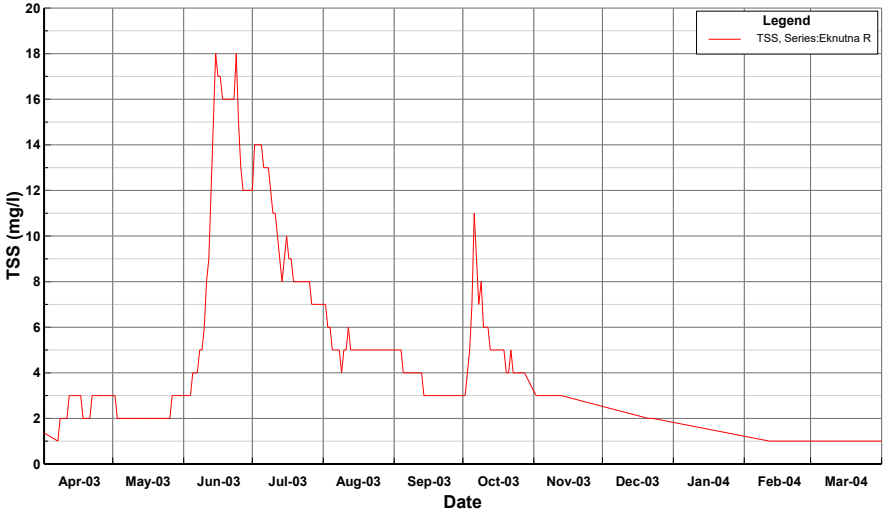


Figure II-23: TSS_Eknutna R

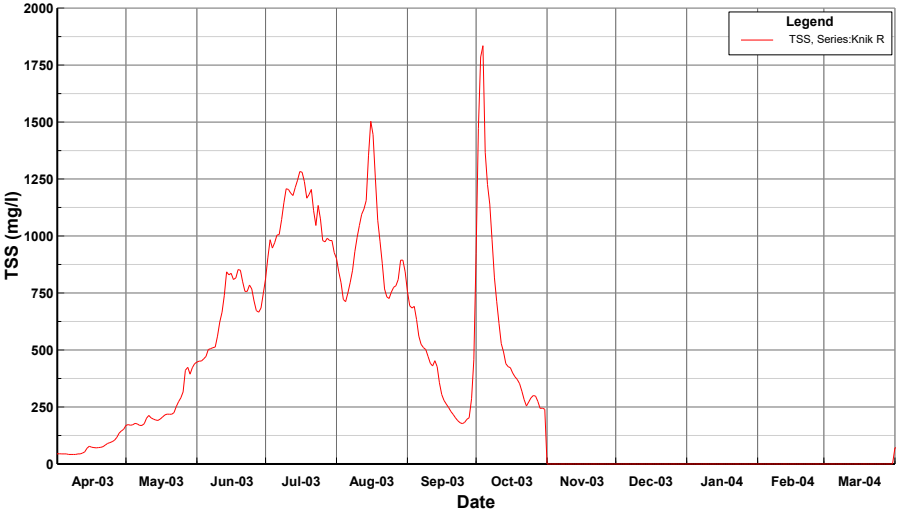


Figure II-24: TSS_Knik R

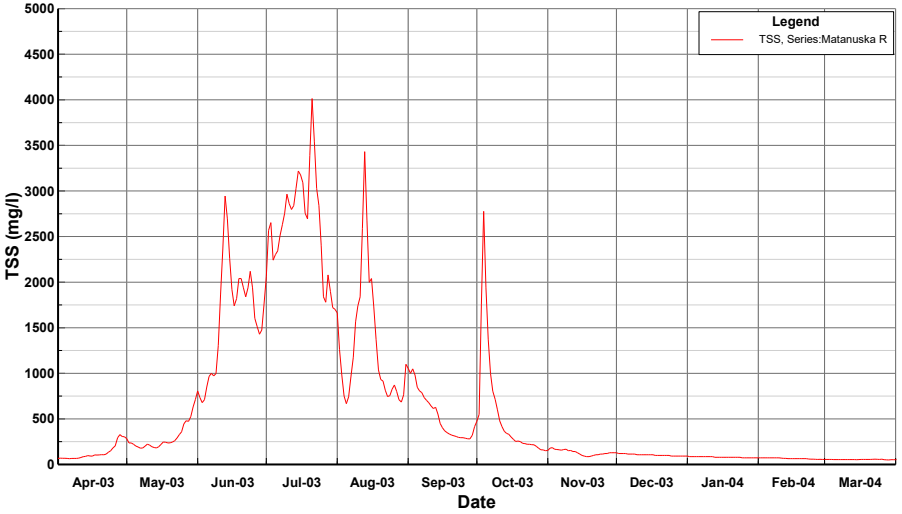


Figure II-25: TSS_Matanuska R

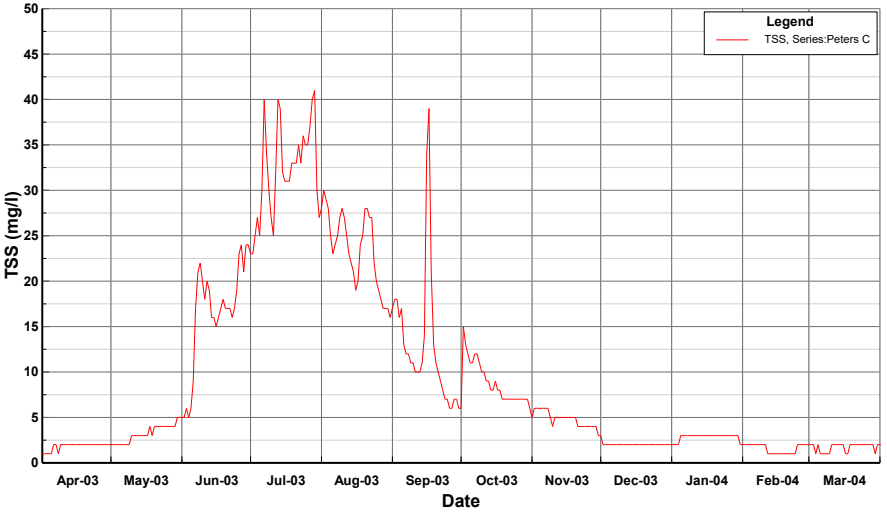
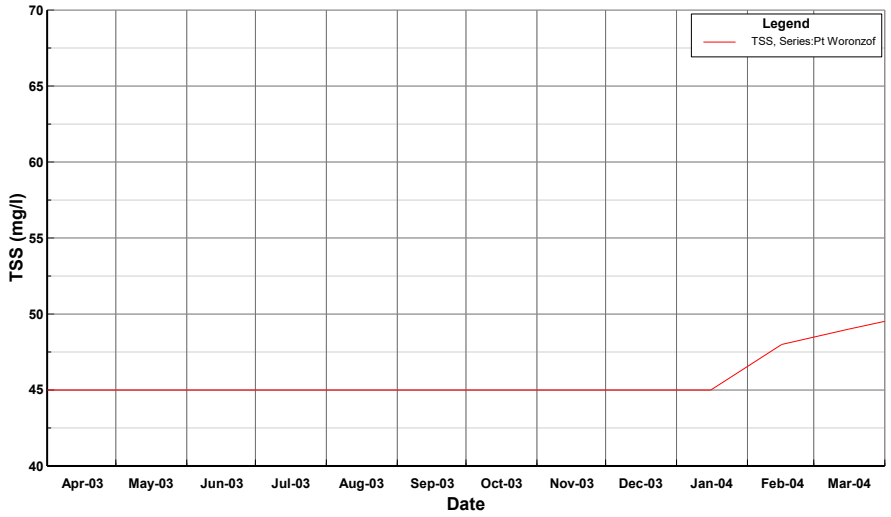


Figure II-26: TSS_Peters C



gure II-27: TSS_Pt Woronzof

Fi

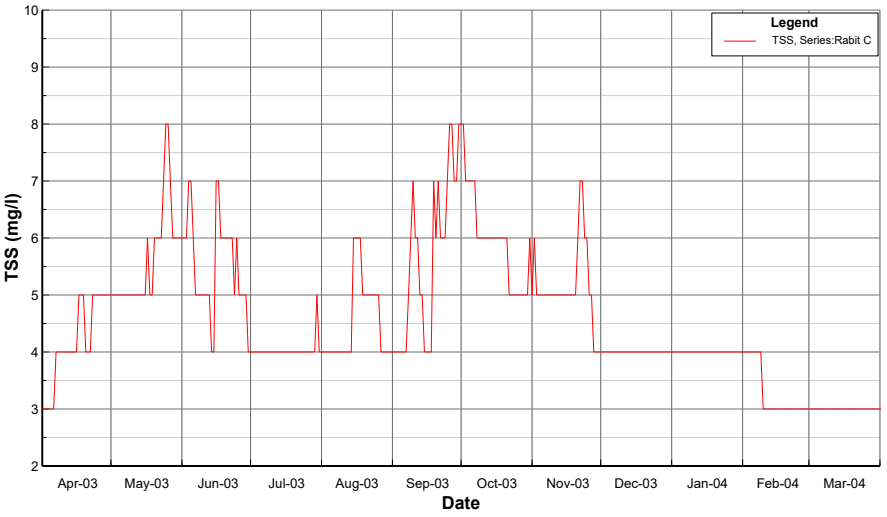


Figure II-28: TSS_Rabit C

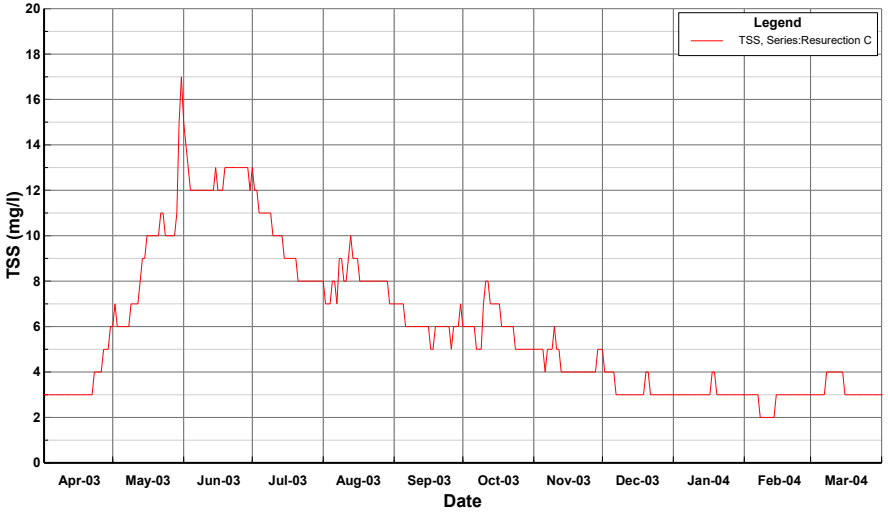


Figure II-29: TSS_Resurection C

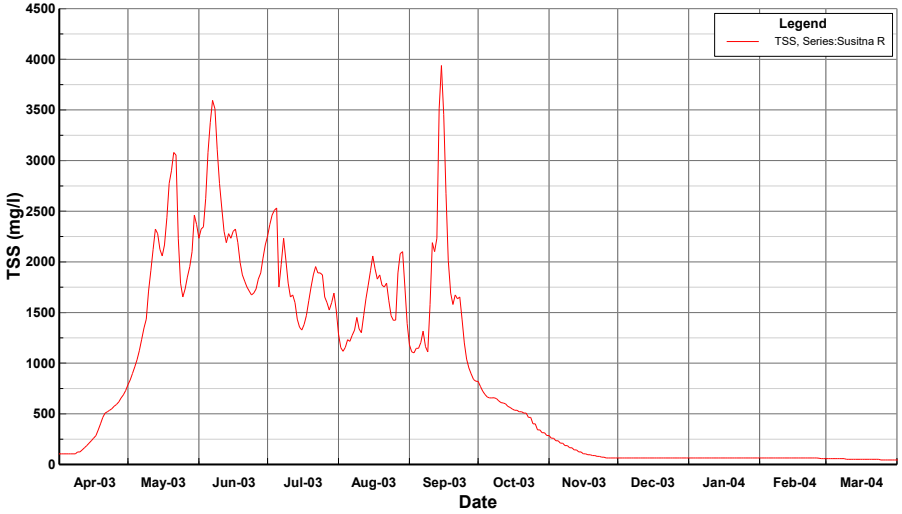


Figure II-30: TSS_Susitna R

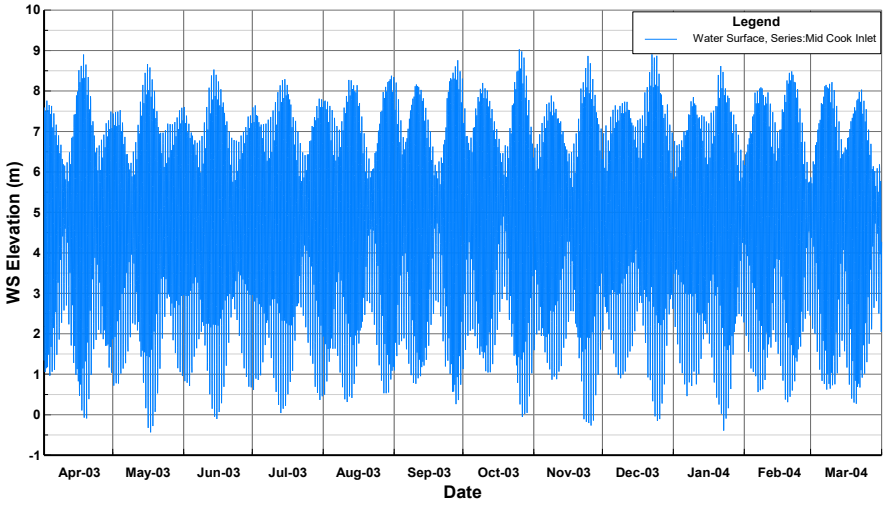
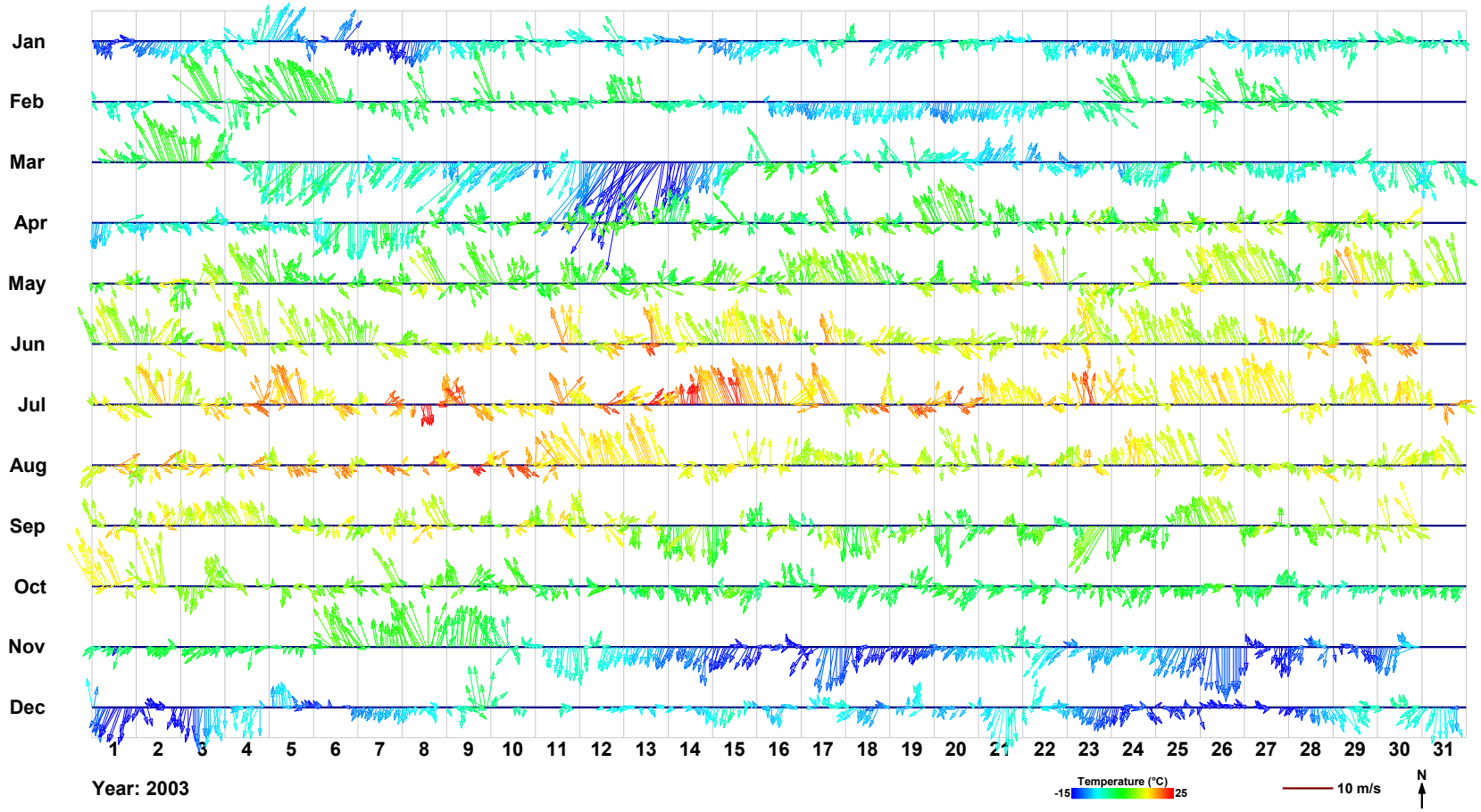


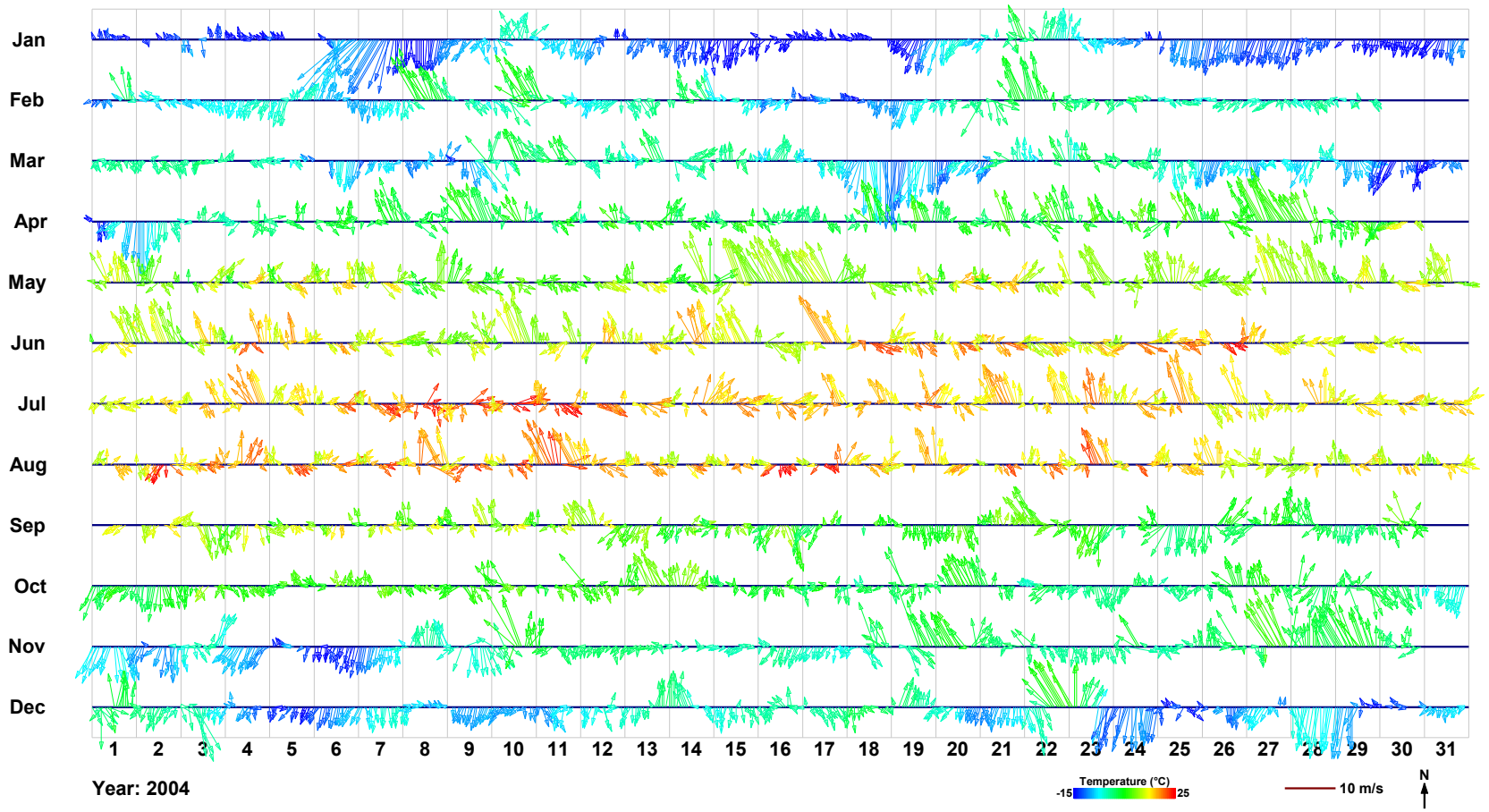
Figure II-31: WS_Mid Cook Inlet

Attachment B3
Anchorage Meteorological Data Stick Plots

Anchorage Airport Wind Vector Stick Plot: 2003



Anchorage Airport Wind Vector Stick Plot: 2004



Attachment B4
Dye Water Column Summary Statistics by Region

No Degradation Case

Block Statistics for: Mid Upper Cook Inlet, Dye

Date	N	Avg	Std Dev	Min	Low Qtile	Median	Up Qtile	Max	Std Err	95% Confid Int
Apr-03	720	3.11E-04	3.39E-04	9.89E-05	2.03E-04	2.83E-04	3.46E-04	6.28E-04	1.26E-05	2.52E-05
May-03	744	3.82E-04	4.07E-04	1.55E-04	2.51E-04	3.67E-04	4.47E-04	6.58E-04	1.49E-05	2.98E-05
Jun-03	720	3.26E-04	3.46E-04	1.45E-04	2.25E-04	3.09E-04	3.60E-04	5.96E-04	1.29E-05	2.58E-05
Jul-03	744	2.13E-04	2.23E-04	1.03E-04	1.56E-04	2.03E-04	2.33E-04	3.63E-04	8.18E-06	1.64E-05
Aug-03	745	2.00E-04	2.08E-04	1.07E-04	1.49E-04	1.97E-04	2.27E-04	3.04E-04	7.63E-06	1.53E-05
Sep-03	720	2.13E-04	2.22E-04	1.05E-04	1.56E-04	2.09E-04	2.44E-04	3.28E-04	8.28E-06	1.66E-05
Oct-03	743	2.36E-04	2.47E-04	9.88E-05	1.77E-04	2.33E-04	2.69E-04	3.84E-04	9.05E-06	1.81E-05
Nov-03	720	2.75E-04	2.90E-04	1.19E-04	1.96E-04	2.66E-04	3.18E-04	4.56E-04	1.08E-05	2.16E-05
Dec-03	744	3.36E-04	3.56E-04	1.36E-04	2.26E-04	3.26E-04	3.94E-04	5.73E-04	1.31E-05	2.61E-05
Jan-04	744	3.95E-04	4.19E-04	1.71E-04	2.66E-04	3.79E-04	4.63E-04	6.89E-04	1.54E-05	3.07E-05
Feb-04	696	4.06E-04	4.32E-04	1.74E-04	2.74E-04	3.91E-04	4.70E-04	7.08E-04	1.64E-05	3.27E-05
Mar-04	720	4.23E-04	4.49E-04	1.75E-04	2.92E-04	4.09E-04	4.87E-04	7.27E-04	1.67E-05	3.35E-05

No Degradation Case

Block Statistics for: Knik Arm, Dye

Date	N	Avg	Std Dev	Min	Low Qtile	Median	Up Qtile	Max	Std Err	95% Confid Int
Apr-03	720	5.57E-04	5.60E-04	3.96E-04	5.19E-04	5.62E-04	5.77E-04	6.61E-04	2.09E-05	4.17E-05
May-03	744	6.15E-04	6.17E-04	4.80E-04	5.89E-04	6.15E-04	6.26E-04	7.06E-04	2.26E-05	4.52E-05
Jun-03	720	4.13E-04	4.26E-04	2.01E-04	3.32E-04	4.08E-04	4.50E-04	5.98E-04	1.59E-05	3.17E-05
Jul-03	744	2.06E-04	2.13E-04	9.83E-05	1.68E-04	2.03E-04	2.19E-04	3.26E-04	7.82E-06	1.56E-05
Aug-03	745	2.01E-04	2.05E-04	1.15E-04	1.69E-04	2.09E-04	2.24E-04	2.54E-04	7.49E-06	1.50E-05
Sep-03	720	2.68E-04	2.71E-04	1.58E-04	2.43E-04	2.74E-04	2.85E-04	3.30E-04	1.01E-05	2.02E-05
Oct-03	743	2.82E-04	2.85E-04	1.60E-04	2.63E-04	2.92E-04	3.02E-04	3.55E-04	1.04E-05	2.09E-05
Nov-03	720	4.15E-04	4.18E-04	2.71E-04	3.83E-04	4.26E-04	4.42E-04	4.92E-04	1.56E-05	3.12E-05
Dec-03	744	5.43E-04	5.45E-04	4.38E-04	5.16E-04	5.49E-04	5.62E-04	6.16E-04	2.00E-05	3.99E-05
Jan-04	744	6.59E-04	6.60E-04	5.56E-04	6.37E-04	6.65E-04	6.74E-04	7.37E-04	2.42E-05	4.84E-05
Feb-04	696	7.23E-04	7.24E-04	6.67E-04	7.09E-04	7.24E-04	7.30E-04	7.81E-04	2.74E-05	5.49E-05
Mar-04	720	7.61E-04	7.62E-04	6.82E-04	7.45E-04	7.62E-04	7.68E-04	8.34E-04	2.84E-05	5.68E-05

No Degradation Case

Block Statistics for: Turnagain Arm, Dye

Date	N	Avg	Std Dev	Min	Low Qtile	Median	Up Qtile	Max	Std Err	95% Confid Int
Apr-03	720	7.47E-05	7.53E-05	5.65E-05	6.94E-05	7.46E-05	7.66E-05	9.99E-05	2.80E-06	5.61E-06
May-03	744	6.15E-05	6.18E-05	4.91E-05	5.63E-05	6.15E-05	6.40E-05	7.57E-05	2.27E-06	4.53E-06
Jun-03	720	5.61E-05	5.65E-05	4.51E-05	5.10E-05	5.42E-05	5.61E-05	7.44E-05	2.11E-06	4.21E-06
Jul-03	744	4.93E-05	4.97E-05	3.61E-05	4.52E-05	5.02E-05	5.21E-05	6.24E-05	1.82E-06	3.64E-06
Aug-03	745	5.31E-05	5.38E-05	3.86E-05	4.66E-05	5.15E-05	5.42E-05	7.69E-05	1.97E-06	3.94E-06
Sep-03	720	5.12E-05	5.16E-05	3.99E-05	4.66E-05	5.03E-05	5.25E-05	6.91E-05	1.92E-06	3.85E-06
Oct-03	743	5.42E-05	5.48E-05	4.10E-05	4.87E-05	5.38E-05	5.60E-05	7.38E-05	2.01E-06	4.02E-06
Nov-03	720	5.77E-05	5.81E-05	4.62E-05	5.34E-05	5.64E-05	5.83E-05	7.91E-05	2.17E-06	4.33E-06
Dec-03	744	6.82E-05	6.86E-05	5.30E-05	6.34E-05	6.63E-05	6.82E-05	8.89E-05	2.52E-06	5.03E-06
Jan-04	744	8.50E-05	8.56E-05	6.52E-05	7.90E-05	8.43E-05	8.72E-05	1.08E-04	3.14E-06	6.27E-06
Feb-04	696	9.71E-05	9.75E-05	7.63E-05	9.09E-05	9.78E-05	1.01E-04	1.17E-04	3.70E-06	7.39E-06
Mar-04	720	9.91E-05	9.95E-05	8.14E-05	9.36E-05	9.96E-05	1.02E-04	1.16E-04	3.71E-06	7.42E-06

150 Day Half Life Case

Block Statistics for: Mid Upper Cook Inlet, Dye

Date	N	Avg	Std Dev	Min	Low Qtile	Median	Up Qtile	Max	Std Err	95% Confid Int
Apr-03	720	2.97E-04	3.23E-04	9.63E-05	1.94E-04	2.71E-04	3.31E-04	5.90E-04	1.20E-05	2.41E-05
May-03	744	3.53E-04	3.77E-04	1.41E-04	2.31E-04	3.39E-04	4.13E-04	6.14E-04	1.38E-05	2.76E-05
Jun-03	720	2.98E-04	3.17E-04	1.32E-04	2.04E-04	2.84E-04	3.30E-04	5.47E-04	1.18E-05	2.36E-05
Jul-03	744	1.99E-04	2.09E-04	9.59E-05	1.44E-04	1.91E-04	2.19E-04	3.39E-04	7.65E-06	1.53E-05
Aug-03	744	1.85E-04	1.92E-04	9.74E-05	1.34E-04	1.81E-04	2.11E-04	2.81E-04	7.06E-06	1.41E-05
Sep-03	720	1.99E-04	2.09E-04	9.56E-05	1.44E-04	1.94E-04	2.30E-04	3.11E-04	7.77E-06	1.55E-05
Oct-03	744	2.17E-04	2.27E-04	9.20E-05	1.60E-04	2.12E-04	2.48E-04	3.62E-04	8.33E-06	1.67E-05
Nov-03	720	2.56E-04	2.70E-04	1.10E-04	1.77E-04	2.49E-04	2.98E-04	4.27E-04	1.01E-05	2.01E-05
Dec-03	744	3.10E-04	3.30E-04	1.23E-04	2.05E-04	3.01E-04	3.63E-04	5.35E-04	1.21E-05	2.42E-05
Jan-04	744	3.60E-04	3.83E-04	1.53E-04	2.39E-04	3.47E-04	4.22E-04	6.32E-04	1.40E-05	2.81E-05
Feb-04	696	3.65E-04	3.89E-04	1.52E-04	2.44E-04	3.53E-04	4.23E-04	6.42E-04	1.48E-05	2.95E-05
Mar-04	717	3.75E-04	3.99E-04	1.51E-04	2.55E-04	3.63E-04	4.35E-04	6.51E-04	1.49E-05	2.98E-05

150 Day Half Life Case

Block Statistics for: Knik Arm, Dye

Date	N	Avg	Std Dev	Min	Low Qtile	Median	Up Qtile	Max	Std Err	95% Confid Int
Apr-03	720	5.30E-04	5.32E-04	3.96E-04	5.01E-04	5.30E-04	5.45E-04	6.41E-04	1.98E-05	3.97E-05
May-03	744	5.55E-04	5.57E-04	4.17E-04	5.27E-04	5.54E-04	5.66E-04	6.48E-04	2.04E-05	4.09E-05
Jun-03	720	3.69E-04	3.81E-04	1.80E-04	3.00E-04	3.63E-04	4.00E-04	5.38E-04	1.42E-05	2.84E-05
Jul-03	744	1.92E-04	1.99E-04	9.22E-05	1.56E-04	1.92E-04	2.05E-04	3.01E-04	7.28E-06	1.46E-05
Aug-03	744	1.88E-04	1.91E-04	1.08E-04	1.58E-04	1.98E-04	2.10E-04	2.39E-04	7.01E-06	1.40E-05
Sep-03	720	2.51E-04	2.54E-04	1.46E-04	2.26E-04	2.56E-04	2.66E-04	3.10E-04	9.47E-06	1.89E-05
Oct-03	744	2.60E-04	2.62E-04	1.47E-04	2.41E-04	2.70E-04	2.79E-04	3.27E-04	9.61E-06	1.92E-05
Nov-03	720	3.79E-04	3.82E-04	2.43E-04	3.49E-04	3.89E-04	4.03E-04	4.49E-04	1.42E-05	2.85E-05
Dec-03	744	4.90E-04	4.91E-04	3.91E-04	4.67E-04	4.94E-04	5.04E-04	5.55E-04	1.80E-05	3.60E-05
Jan-04	744	5.83E-04	5.85E-04	4.81E-04	5.63E-04	5.88E-04	5.99E-04	6.54E-04	2.14E-05	4.29E-05
Feb-04	696	6.30E-04	6.30E-04	5.67E-04	6.13E-04	6.30E-04	6.39E-04	6.83E-04	2.39E-05	4.78E-05
Mar-04	717	6.54E-04	6.55E-04	5.96E-04	6.36E-04	6.54E-04	6.63E-04	7.21E-04	2.45E-05	4.89E-05

150 Day Half Life Case

Block Statistics for: Turnagain Arm, Dye

Date	N	Avg	Std Dev	Min	Low Qtile	Median	Up Qtile	Max	Std Err	95% Confid Int
Apr-03	720	7.13E-05	7.18E-05	5.40E-05	6.50E-05	7.08E-05	7.36E-05	9.73E-05	2.68E-06	5.35E-06
May-03	744	5.51E-05	5.55E-05	4.23E-05	5.01E-05	5.50E-05	5.72E-05	6.99E-05	2.03E-06	4.07E-06
Jun-03	720	4.89E-05	4.93E-05	3.77E-05	4.41E-05	4.73E-05	4.91E-05	6.67E-05	1.84E-06	3.68E-06
Jul-03	744	4.28E-05	4.32E-05	3.01E-05	3.88E-05	4.34E-05	4.53E-05	5.51E-05	1.58E-06	3.17E-06
Aug-03	744	4.34E-05	4.38E-05	3.27E-05	3.89E-05	4.27E-05	4.48E-05	5.82E-05	1.61E-06	3.21E-06
Sep-03	720	4.44E-05	4.48E-05	3.36E-05	3.99E-05	4.35E-05	4.56E-05	6.17E-05	1.67E-06	3.34E-06
Oct-03	744	4.52E-05	4.56E-05	3.34E-05	4.06E-05	4.57E-05	4.76E-05	5.98E-05	1.67E-06	3.34E-06
Nov-03	720	4.85E-05	4.90E-05	3.55E-05	4.40E-05	4.73E-05	4.89E-05	6.92E-05	1.83E-06	3.65E-06
Dec-03	744	5.97E-05	6.02E-05	4.39E-05	5.51E-05	5.83E-05	6.02E-05	8.01E-05	2.21E-06	4.41E-06
Jan-04	744	7.43E-05	7.49E-05	5.48E-05	6.88E-05	7.40E-05	7.70E-05	9.58E-05	2.74E-06	5.49E-06
Feb-04	696	8.34E-05	8.39E-05	6.31E-05	7.75E-05	8.43E-05	8.66E-05	1.02E-04	3.18E-06	6.36E-06
Mar-04	717	8.30E-05	8.34E-05	6.62E-05	7.77E-05	8.34E-05	8.58E-05	9.85E-05	3.11E-06	6.23E-06

7 Day Half Life Case

Block Statistics for: Mid Upper Cook Inlet, Dye

Date	N	Avg	Std Dev	Min	Low Qtile	Median	Up Qtile	Max	Std Err	95% Confid Int
Apr-03	720	1.54E-04	1.67E-04	4.54E-05	9.76E-05	1.49E-04	1.79E-04	2.98E-04	6.21E-06	1.24E-05
May-03	744	1.38E-04	1.49E-04	4.64E-05	8.57E-05	1.36E-04	1.67E-04	2.44E-04	5.48E-06	1.10E-05
Jun-03	720	1.24E-04	1.32E-04	4.98E-05	8.03E-05	1.21E-04	1.46E-04	2.15E-04	4.92E-06	9.84E-06
Jul-03	744	1.01E-04	1.07E-04	4.56E-05	6.82E-05	9.91E-05	1.19E-04	1.68E-04	3.92E-06	7.85E-06
Aug-03	744	9.94E-05	1.05E-04	4.37E-05	6.66E-05	9.73E-05	1.17E-04	1.60E-04	3.86E-06	7.71E-06
Sep-03	720	1.03E-04	1.09E-04	4.10E-05	6.93E-05	1.01E-04	1.22E-04	1.67E-04	4.07E-06	8.13E-06
Oct-03	744	1.07E-04	1.13E-04	3.83E-05	7.40E-05	1.06E-04	1.25E-04	1.81E-04	4.14E-06	8.29E-06
Nov-03	720	1.21E-04	1.30E-04	4.25E-05	7.88E-05	1.20E-04	1.46E-04	2.08E-04	4.84E-06	9.67E-06
Dec-03	744	1.30E-04	1.40E-04	4.20E-05	8.12E-05	1.28E-04	1.56E-04	2.26E-04	5.14E-06	1.03E-05
Jan-04	745	1.38E-04	1.49E-04	4.70E-05	8.55E-05	1.35E-04	1.67E-04	2.44E-04	5.47E-06	1.09E-05
Feb-04	696	1.34E-04	1.45E-04	4.83E-05	8.21E-05	1.30E-04	1.62E-04	2.48E-04	5.50E-06	1.10E-05
Mar-04	720	1.37E-04	1.48E-04	4.59E-05	8.62E-05	1.35E-04	1.66E-04	2.47E-04	5.53E-06	1.11E-05

7 Day Half Life Case

Block Statistics for: Knik Arm, Dye

Date	N	Avg	Std Dev	Min	Low Qtile	Median	Up Qtile	Max	Std Err	95% Confid Int
Apr-03	720	2.33E-04	2.52E-04	8.13E-05	1.69E-04	2.07E-04	2.42E-04	6.41E-04	9.39E-06	1.88E-05
May-03	744	1.40E-04	1.46E-04	5.93E-05	1.01E-04	1.46E-04	1.63E-04	2.09E-04	5.34E-06	1.07E-05
Jun-03	720	1.12E-04	1.17E-04	4.95E-05	7.99E-05	1.16E-04	1.29E-04	1.75E-04	4.35E-06	8.71E-06
Jul-03	744	8.75E-05	9.15E-05	3.51E-05	6.31E-05	9.21E-05	1.03E-04	1.36E-04	3.35E-06	6.71E-06
Aug-03	744	9.22E-05	9.57E-05	4.11E-05	7.01E-05	9.65E-05	1.09E-04	1.30E-04	3.51E-06	7.02E-06
Sep-03	720	1.08E-04	1.11E-04	5.23E-05	8.62E-05	1.13E-04	1.24E-04	1.48E-04	4.13E-06	8.27E-06
Oct-03	744	1.06E-04	1.09E-04	4.01E-05	8.41E-05	1.12E-04	1.23E-04	1.46E-04	3.98E-06	7.97E-06
Nov-03	720	1.31E-04	1.35E-04	6.77E-05	1.04E-04	1.37E-04	1.49E-04	1.78E-04	5.02E-06	1.00E-05
Dec-03	744	1.37E-04	1.41E-04	7.52E-05	1.03E-04	1.44E-04	1.58E-04	1.91E-04	5.18E-06	1.04E-05
Jan-04	745	1.43E-04	1.48E-04	6.55E-05	1.06E-04	1.50E-04	1.68E-04	2.00E-04	5.43E-06	1.09E-05
Feb-04	696	1.42E-04	1.47E-04	6.77E-05	1.07E-04	1.50E-04	1.67E-04	2.01E-04	5.57E-06	1.11E-05
Mar-04	720	1.46E-04	1.51E-04	6.53E-05	1.08E-04	1.54E-04	1.71E-04	2.04E-04	5.62E-06	1.12E-05

7 Day Half Life Case

Block Statistics for: Turnagain Arm, Dye

Date	N	Avg	Std Dev	Min	Low Qtile	Median	Up Qtile	Max	Std Err	95% Confid Int
Apr-03	720	3.23E-05	3.67E-05	1.09E-05	1.95E-05	2.60E-05	3.17E-05	9.61E-05	1.37E-06	2.73E-06
May-03	744	1.30E-05	1.34E-05	5.61E-06	1.06E-05	1.27E-05	1.38E-05	2.14E-05	4.91E-07	9.82E-07
Jun-03	720	1.15E-05	1.19E-05	4.84E-06	9.15E-06	1.11E-05	1.21E-05	2.06E-05	4.45E-07	8.90E-07
Jul-03	744	1.06E-05	1.09E-05	4.18E-06	8.43E-06	1.04E-05	1.18E-05	1.72E-05	4.01E-07	8.02E-07
Aug-03	744	1.23E-05	1.27E-05	5.56E-06	9.74E-06	1.18E-05	1.30E-05	2.04E-05	4.67E-07	9.35E-07
Sep-03	720	1.23E-05	1.28E-05	6.19E-06	9.78E-06	1.17E-05	1.30E-05	2.18E-05	4.78E-07	9.57E-07
Oct-03	744	1.22E-05	1.27E-05	5.98E-06	9.68E-06	1.20E-05	1.32E-05	2.02E-05	4.64E-07	9.28E-07
Nov-03	720	1.39E-05	1.44E-05	6.02E-06	1.13E-05	1.36E-05	1.45E-05	2.47E-05	5.35E-07	1.07E-06
Dec-03	744	1.68E-05	1.72E-05	8.14E-06	1.41E-05	1.70E-05	1.79E-05	2.63E-05	6.30E-07	1.26E-06
Jan-04	745	1.90E-05	1.95E-05	8.71E-06	1.59E-05	1.97E-05	2.08E-05	2.95E-05	7.14E-07	1.43E-06
Feb-04	696	1.80E-05	1.85E-05	9.00E-06	1.45E-05	1.82E-05	1.96E-05	2.79E-05	7.01E-07	1.40E-06
Mar-04	720	1.73E-05	1.79E-05	8.32E-06	1.38E-05	1.75E-05	1.89E-05	2.67E-05	6.69E-07	1.34E-06

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Acronyms and Abbreviations

µg/L	microgram(s) per liter
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
AK	Alaska
AUF	area use factor
AWPCF	Asplund Wastewater Pollution Control Facility
AWWU	Anchorage Water and Wastewater Utility
BAF	bioaccumulation factor
BM	benchmark
BE	Biological Evaluation
BPAs	bisphenols
CEC	contaminant of emerging concern
CFR	*Code of Federal Regulations*
CSM	conceptual site model
DF	dilution factor
DPS	Distinct Population Segment
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
ESA	Endangered Species Act
FCM	food chain multiplier
FIR	daily food ingestion rate
FR	*Federal Register*
HQ	hazard quotient
kg/kg/d	kilogram(s) per kilogram per day
L/kg	liter(s) per kilogram
L/kg/d	liter(s) per kilogram per day
LANL	Los Alamos National Laboratory
LOAEL	lowest observed adverse effect level

LOEC	lowest observed effect concentration
MF	migration factor
mg/kg	milligram(s) per kilogram
mg/kg/d	milligram(s) per kilogram receptor body weight per day
mg/L	milligram(s) per liter
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NPDES	National Pollutant Discharge Elimination System
NPs	nonylphenols
PAH	polycyclic aromatic hydrocarbon
PBDEs	polybrominated diphenyl ethers
PCB	polychlorinated biphenyls
PFAS	per- and polyfluoroalkyl substances
PFOS	perfluorooctane sulfonic acid
RME	reasonable maximum exposure
SVOC	semi-volatile organic compounds
TRV	toxicity reference value
UCL	upper confidence limit
UCL95	95 percent upper control limit
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compounds
WET	whole effluent toxicity
WIR	daily water ingestion rate
WWTF	Wastewater Treatment Facility
ZID	Zone of Initial Dilution

Appendix C. Ecological Risk Evaluation

C.1 Introduction

This Ecological Risk Evaluation was prepared in support of the Biological Evaluation (BE) for the Anchorage Water and Wastewater Utility (AWWU) John M. Asplund Water Pollution Control Facility (AWPCF) (Jacobs 2025). The overall objectives of the evaluation are to quantitatively and qualitatively evaluate potential risks to the endangered Cook Inlet beluga whales and the Western Distinct Population Segment (DPS) of Steller sea lions from exposure to residual contaminants present in AWPCF effluent.

Potential risks from exposure to residual contaminants in the AWPCF effluent stream were evaluated for two primary exposure pathways: (1) potential for adverse effects to prey fish exposed to AWPCF effluent, and (2) potential for adverse effects to the Cook Inlet beluga whale and Western DPS Steller sea lions from ingestion of prey fish that may have bioaccumulated contaminants from the AWPCF effluent (also referred to as food chain uptake). Each exposure pathway was evaluated for four different spatial exposure areas within Cook Inlet and under both conservative and refined exposure and toxicity assumptions to provide a range of risk estimates for each exposure scenario/receptor.

The results of the ecological risk evaluation provide the information needed to support determinations of effect as defined by the Endangered Species Act (ESA) and presented in the BE.

C.1.1 Organization

The AWWU AWPCF Ecological Risk Evaluation is organized into the following sections:

- **Section C.1, Introduction** – Provides the objectives and scope, guidance, approach, assumptions, and organization used in the evaluation.
- **Section C.2, Problem Formulation** – Provides information on the site description, history, and ecological setting; develops the ecological conceptual site model; establishes assessment endpoints and measures; and identifies the data used in the assessment.
- **Section C.3, Risk Evaluation for Prey Fish** – Exposure characterization for prey species, characterization of effects, preliminary screening, refined assessment, recommendations for further evaluation in the risk description.
- **Section C.4, Risk Evaluation for Marine Mammals** – Exposure characterization for Cook Inlet beluga whale and Western DPS Steller sea lion, characterization of effects, preliminary screening, refined assessment, recommendations for further evaluation in the risk description.
- **Section C.5, Risk Description** – Lines of evidence for the risk evaluation and conclusions.
- **Section C.6 – References** – Lists works cited in this evaluation.

C.1.2 Risk Evaluation Guidance

The Ecological Risk Evaluation for AWPCF was completed in accordance with the Section 7 consultation provisions of the ESA and using the following ecological risk assessment guidance:

- *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments*, Interim Final (EPA 1997)
- *Guidelines for Ecological Risk Assessment* (EPA 1998)

- *The Role of Screening-Level Risk Assessments and Refining Contaminants of Concern in Baseline Ecological Risk Assessments* (EPA 2001)
- *Risk Assessment Procedures Manual* (ADEC 2018)

C.1.3 Risk Evaluation Approach

The risk evaluation for AWPCF was conducted by adapting principles of the approach for risk assessments recommended by EPA (1997,1998, 2001; ADEC 2018) to be applicable to the AWWU-managed AWPCF. A phased approach was used to estimate risks for each receptor.

Preliminary Screening. The preliminary screening is a conservative evaluation whereby the exposure and toxicity parameters are applied without refinement or consideration of realistic variables impacting receptor exposure to contaminants. The preliminary screening risk estimates are not considered a realistic representation of risk, but rather a maximum potential used as a starting point for refined ecological risk estimates. Contaminants with potential risk in the preliminary screening are retained for further evaluation in the refined assessment.

Refined Assessment. The refined assessment risk estimates present a more realistic exposure scenario, considering probable exposure concentrations, exposure durations, and receptor variables.

Scientific management decisions are made at the conclusion of each phase to provide recommendations based on the data. The possible outcomes are as follows:

- If the preliminary screening scenario indicates the potential for risk is not likely under maximum risk conditions, further evaluation and refinement is unnecessary, and it is concluded that the potential for risk is not likely.
- If the preliminary screening scenario indicates there is potential for risk, the scenario is further evaluated in refined assessment to reduce uncertainty and to represent a more realistic exposure scenario.
- If the refined assessment indicates a potential for risk, the results are considered with other qualitative and quantitative lines of evidence being evaluated in the risk description.

The results of the risk description support risk management recommendations, which are further discussed and applied in the BE to develop ESA Section 7 determinations of effect.

C.1.4 Risk Evaluation Assumptions

This risk evaluation was conducted under the following assumptions and constraints, which are typical for the current state of practice for ecological risk evaluations:

- The evaluation is derived from existing conditions.
- Future conditions are assumed to remain the same as current conditions.
- Current contaminant concentrations in the effluent are present at a steady state and will not change from permitted conditions over time.
- Chemicals not detected or analyzed are not evaluated.
- Each chemical is as bioavailable as the chemical on which the available toxicity information is based when used for estimating adverse effects to each receptor.

- The bioaccumulation of chemicals in prey fish was based on measured concentrations in fish or through use of literature on bioaccumulation factors (BAFs), bioconcentration factors (BCFs), or uptake regression models.
- The toxicological information used represents information currently available from literature and database searches.

As with all risk assessments, some assumptions that must be made are more or less realistic than others. The potential impacts of these assumptions are considered in the uncertainty section and the risk description (**Section C.5**).

C.2 Problem Formulation

The problem formulation provides the background information used to further develop exposure scenarios to refine the risk estimates to inform the risk description. This step combines information on the site description and history, physical setting, ecological setting, conceptual site model development, identification of contaminant sources and transport mechanisms, and evaluation of primary exposure routes. It establishes assessment endpoints and measures for this risk evaluation.

C.2.1 Site Description and History

AWPCF is owned and operated by AWWU. It is located on Point Woronzof in Anchorage, Alaska, and services primarily domestic influents with minor industrial components from Joint Base Elmendorf-Richardson, Eagle River Wastewater Treatment Facility (WWTF), Girdwood WWTF, Anchorage Regional Landfill, Merrill Field Landfill, and Matanuska Susitna Borough Landfill. AWPCF discharges treated effluent subsurface into marine waters offshore of Point Wornzof into Cook Inlet through a single discharge point. The discharge pipe is outfitted with a diffuser designed to reduce turbidity and increase dilution rates (refer to **Section 1.2.3** of the BE). After treated effluent is discharged, it mixes with marine surface waters into ambient conditions.

AWPCF operates under the current National Pollutant Discharge Elimination System (NPDES) Permit No. AK-002255-1 and conducts routine monitoring and testing in accordance with permit requirements. The permit was first obtained in 1985 and was subsequently renewed in 2000. An application for the NPDES permit renewal and modification is currently in process. This risk evaluation, BE, and associated attachments were developed in support of permit renewal. Included in the permit application is a reduction in the size of the zone of initial dilution (ZID) from a 650-meter radius around the outfall to a 350-meter radius. The updated ZID of a 350-meter radius covering 220 degrees (a 235-square kilometer [km^2] surface area) is proposed as the action area for Section 7 ESA consultation purposes. Characterizing how effluents mix with marine receiving waters is critical to understanding the fate and transport of potential contaminants discharged by the AWPCF. To understand how contaminants may dilute under various conditions, and to establish the proposed regulatory ZID, an Outfall Mixing Zone Study and hydrodynamic model (Jacobs 2024a) were developed. This evaluation considers potential risk of discharge into the offshore marine ecosystem of Cook Inlet and applies the dilution modeling developed in the mixing zone study to estimate exposure conditions.

C.2.2 Physical Setting

Cook Inlet is a semi-enclosed, generally shallow, subarctic tidal estuary within the Cook Inlet Basin ecoregion (ADEC 2024a). The inlet is 370 kilometers long and drains southward to the Gulf of Alaska (Jones et al. 2020); it is bordered by 1,350 kilometers of coastline and covers an area of roughly 20,000 km^2 (Rugh et al. 2000). Cook inlet branches into two extensions: Turnagain Arm southeast of Anchorage

and Knik Arm north of Anchorage (refer to **Figure C-1)**. Several rivers flow into Cook Inlet, draining an average of 3,285 cubic meters per second (m^3/s) of freshwater and sediments from the surrounding drainages (Brabets et al. 1999). These rivers include the Susitna, Matanuska, Kenai, Knik, Kasilof, Beluga, McArthur, and Drift rivers.

Cook Inlet has mixed tidal cycles, with two unequal high and low tides occurring in 24-hour intervals (Musgrave and Statscewich 2006). The inlet experiences some of the highest tidal amplitudes in the world, creating a highly dynamic system that mixes and transports water and sediments from the connected riverine systems (Richardson and Schmalz 2012). Benthic substrates in the vicinity of Point Woronzof and in the action area are scoured by high tides and currents and consist of coarse gravel, cobble, and rocks. The immense volume of water flowing into and out of Cook inlet contributes to the variable conditions considered in the mixing zone study (Jacobs 2024a). Adding to the inlet's ecosystem variability, Alaska's dry and wet seasons lead to seasonal expected minimum and maximum freshwater inputs from the various river systems. All these considerations are important and affect the ecosystem and fate and transport of AWPCF effluent.

Sea ice is widespread throughout Cook inlet during winter, but the amount of cover varies annually and is not consistent throughout the inlet (BOEM 2016). Ice presence in the upper inlet is predominantly driven by ambient air temperatures, while ice in the lower inlet depends on air temperature and the inflow rate of the Alaskan Coastal Current (Shelden et al. 2014). The presence of sea ice can be a driver for marine prey availability and affect the population distributions of marine mammals.

C.2.3 Ecological Setting

A detailed biological baseline describing the ecosystem conditions in Cook Inlet and within the AWPCF effluent action area is provided in Section 3.3 of the BE. A general overview of the ecological setting as it pertains to the refinement of exposure scenarios and the identified receptors is presented in this subsection.

Cook inlet supports many bird, mammal, fish, and macroinvertebrate species that are present both seasonally and year round. The dynamic environment in conjunction with this biodiversity creates an ever-changing complex ecosystem. The distribution of wildlife throughout Cook Inlet provides insights to its subregions that are highly productive and may support healthy and abundant populations of marine organisms. During summer salmon runs, wildlife and marine mammals congregate near the mouths of rivers to feed on the abundant resources (Norman et al. 2015, Dutton et al. 2012). When prey is not seasonally abundant near river mouths, other highly productive areas within Cook Inlet support foraging for abundant species such as saffron, starry flounder, and Pacific cod.

Point Woronzof, where the AWWU-managed AWPCF facility is located, does not recruit high numbers of seasonally available prey because of the absence of any major riverine system, strong tides at that location, and highly turbid waters. A benthic survey was conducted near Point Woronzof, within a 1,400-meter radius of the outfall diffuser, to evaluate and survey the benthic conditions and communities. The survey found that diversity of infauna was generally low and the benthic community was sparsely represented in some areas (Jacobs 2024b). Further, the survey found the substrate to be coarse with little accumulating sediments, confirming that the tides and currents make the substrate generally unsuitable for diverse benthic communities. Food availability and structural diversity are key habitat features that drive the presence of secondary trophic consumers such as prey fish (Vanni 1987). The absence of defining structure and limited benthic diversity near Point Woronzof and within the ZID further suggests that the outfall location is not a primary productive area where tertiary consumers would be expected to congregate on a regular basis. Acoustic monitoring data and direct observations of Cook Inlet beluga whales confirm that tertiary consumers would be expected to transit through the ZID and Point Woronzof

on their way to more desirable feeding or calving locations rather than traveling to Point Woronzof specifically for regular foraging behaviors (McGuire et al. 2020, Wade et al. 2024, Castollote et al. 2020, Funk et al. 2005).

Cook Inlet beluga whales and Western DPS Steller sea lions are both special-status marine mammals that could reside in, forage, or pass through Cook Inlet. The protection of these endangered species in accordance with the ESA and the Marine Mammal Protection Act (1972) is of high importance and the primary subject of this risk evaluation.

C.2.3.1 Cook Inlet Beluga Whales

Beluga whales are known for their white color, range of vocal sounds, and social groups (NOAA 2024a). They frequent coastal bays and inlets and can move between marine and freshwater habitats. The Cook Inlet DPS is considered unique; these individuals generally reside and forage exclusively within Cook Inlet year-round (Young et al. 2023, Shelden et al. 2018). Beluga whales can grow to be 4.9 meters long, have an average adult weight of 1,428 kilograms, and live up to 90 years (NOAA 2024a). The Cook Inlet beluga whale DPS was listed as endangered under the ESA in 2008 (NOAA 2024a).

While beluga whales may have a varied diet; Cook Inlet beluga whales have been found to consume predominantly fish (Quakenbush et al. 2015). In the spring, eulachon (*Thaleichthys pacificus*, also named hooligan and candlefish) and gadids are the preferred beluga prey. The stomach of a beluga harvested near the Susitna River in April 1998 was filled exclusively with eulachon (Huntington 2000, Moore et al. 2000). Gadids, such as saffron cod (*Eleginus gracilis*), are indigenous to shallow coastal waters and are found near and in rivers within the zone of tidal influence. Natives report that Cook Inlet beluga whales also feed on freshwater fish such as trout, whitefish, northern pike, and grayling. Beluga whales in Cook Inlet often aggregate near the mouths of rivers and streams where salmon runs occur.

By late spring, belugas begin to shift from lipid-poor prey to lipid-rich species when anadromous fish runs of Pacific salmon (*Oncorhynchus* spp.) enter the inlet. From late spring and throughout the summer months, most of the contents from beluga whale stomachs analyzed contained Pacific salmon coincident with the timing of fish runs. In the fall, as anadromous fish runs begin to decline, belugas again return to consume the fish species found in nearshore bays and estuaries, including cod species observed in the spring diet as well as other bottom-dwellers such as Pacific staghorn sculpin (*Leptocottus armatus*) and flatfishes such as starry flounder (*Platichthys stellatus*) and yellowfin sole (*Limanda aspera*).

Beluga whales in captivity may consume 2.5% to 3% of their body weight daily, or approximately 40 to 60 pounds (SeaWorld, 2024). Wild beluga whale populations, faced with an irregular supply of food or with increased metabolic needs, may easily exceed these amounts while feeding on concentrations of eulachon and salmon.

C.2.3.2 Western DPS Steller Sea Lions

Steller sea lions are the largest member of the sea lion family Otariidae. Steller sea lions are sexually dimorphic and adult males are much larger than females. Adult males may be up to 3.4 meters long and weigh up to 1,134 kilograms while females may be up to 2.9 meters long, weigh an average of 263 kilograms, and weigh as much as 362 kilograms (NOAA 2024b, ADF&G 2024). The Western DPS was listed as endangered in 1997 (62 *Federal Register* [FR] 24345, 58 FR 45269). While few individuals have been observed within Cook Inlet, Steller sea lions would not regularly be expected to reside within upper Cook Inlet or near the outfall for extended periods of time.

As with beluga whales, Steller sea lions have a varied diet but predominantly consume fish and cephalopods (NOAA 2024b). Energetic needs vary by sex and season; female sea lions have higher energetic demand to support reproduction and nursing requirements (Trites and Calkins 2008). While direct evidence of food consumption is limited, energetic modeling estimates that female Steller sea lions require up to 8% of their bodyweight in food per day (Winship et al. 2002).

Male Steller sea lions have been found to have more expansive home ranges than females, which have more territorial fidelity near breeding rookeries (Bishop et al. 2018). There are no established rookeries or haulouts within Cook Inlet; the nearest rookery is located on Sugarloaf Island beyond the defined boundary of Cook Inlet (NOAA 2024c). Steller sea lion critical habitat does not extend into Cook Inlet waters (Bishop et al. 2018, NOAA 2024c).

C.2.3.3 Beluga and Steller Sea Lion Prey Species

Beluga whales and Steller sea lions are opportunistic feeders known to consume a wide variety of prey species, focusing on specific species when they are seasonally abundant (NMFS 2008a, 2008b). They are reported to consume mid-trophic level fish such as salmon, eulachon, capelin, cod, herring, flounder, sole, sculpin, lamprey, and lingcod, along with other lower trophic aquatic organisms such as octopus, squid, crabs, shrimp, clams, mussels, snails, and sandworms.

C.2.4 Conceptual Site Model

The conceptual site model (CSM) combines information on potential receptors, potential sources of contaminants, and potential exposure pathways to provide an overall picture of site-related exposures from contaminants. The ecological CSM is described in the following subsections.

C.2.4.1 Potential Sources of Contaminants

The evaluation of potential sources of contaminants within the action area is limited to those components of AWPCF effluent discharged into the marine waters of Cook Inlet. Other nonpoint sources of contaminants to the action area are not evaluated but may contribute to the overall exposure and risk to prey species and marine mammals. Contaminants found in AWPCF effluent originate from both the municipal and nondomestic sources of wastewater accepted by the AWPCF facility. Identification of specific contaminant sources found in effluent can be challenging; however, AWWU maintains a pretreatment program requiring nondomestic discharges to comply with AWWU's pretreatment standards. Influent sampling conducted in conjunction with effluent monitoring can inform contaminant transport within the CSM. Influent, effluent, and sludge monitoring results are available in the AWWU annual monitoring reports (refer to Appendix A).

C.2.4.2 Evaluation of Exposure Pathways

Exposure pathways refer to the exposure media (abiotic and biotic) and exposure routes through which contaminants may reach ecological receptors. Exposure pathways must meet specific criteria for exposure to occur. For an exposure to be evaluated quantitatively, there must be:

- Receptors (e.g., beluga whale)
- Necessary habitat for the identified receptor (e.g., Cook Inlet)
- Contaminant source (e.g., wastewater effluent)
- Mechanism for contaminant release (e.g., AWPCF effluent to Cook Inlet)
- Exposure point (e.g., marine surface water)
- Feasible exposure route (e.g., oral ingestion)

If any of these points are absent, the exposure route is not considered to represent a realistic exposure pathway. Considering this risk evaluation is conducted for listed species to support the U.S. Environmental Protection Agency (EPA) ESA Section 7 consultation with NMFS, exposure pathways are limited to those with conditional potential to impact ESA-listed species managed by NMFS. The evaluated receptors include Cook Inlet beluga whales, Western DPS Steller sea lions, and their prey. Exposure pathways to receptors beyond this scope are not evaluated.

C.2.4.2.1 AWPCF Exposure Conditions

Receptors

Cook Inlet DPS beluga whales and the Western DPS of Steller sea lions are ESA-listed species that have been identified as receptors expected to occur within the action area at limited frequencies (NOAA 2024a, ADF&G 2024). Other ESA-listed marine species considered to rarely occur within the action area are discussed in the BE but not evaluated quantitatively in this ecological risk evaluation. Beluga whales and Steller sea lions rely upon prey abundance to survive. Cook Inlet supports fish and invertebrates that serve as the basis for prey species. While many prey organisms exhibit seasonal variability, fish that serve as the primary component of beluga and sea lion diets could be expected to occur within the action area.

Necessary Habitat

Critical habitat has been designated under the ESA within Cook Inlet for the beluga whale and the inlet offers habitat capable of supporting Steller sea lion and prey species populations. The action area as defined in the BE is near Point Woronzof and highly scoured by tidal currents; there is limited productive capacity to support large populations of fish and benthic infauna (Houghton et al. 2005). Sampling of benthic infauna and fish in support of the BE confirmed low densities of prey species and habitat within the action area but some organisms that could be foraged by marine mammal receptors were found (refer to **Appendix A** of the BE).

Contaminant Source and Release

Chemical monitoring of AWPCF influents confirms that municipal and industrial contaminants enter the treatment facility (Kinnetic Environmental 2024a, 2024b). Regular monitoring of AWPCF effluent required by the NPDES permit and targeted sampling for contaminants of emerging concern (CECs) indicate that some of these contaminants are present in effluent discharged to the action area.

Exposure Point and Exposure Route

Contaminants present in AWPCF effluent are dissolved/suspended in aqueous solution and discharged to marine waters where they are diluted by receiving waters. Therefore, marine mammals and aquatic organisms have the potential to be exposed to contaminants in AWPCF marine receiving waters. Receptors in the action area could be exposed to contaminants through direct contact with contaminants in marine water or through oral ingestion from contaminant bioaccumulation in the food chain.

C.2.4.2.2 AWPCF Complete Exposure Routes

Exposure routes to receptors are limited to aquatic exposure pathways where contaminants released to marine waters in the AWPCF effluent stream are biologically available to aquatic organisms/prey fish, beluga whales, and Steller sea lions. Because prey abundance is critical to the survival of belugas and Steller sea lions, potential risks to aquatic organisms (prey fish) were considered in addition to potential

risks to the beluga whale and Steller sea lion. Species considered within the evaluation are summarized in **Table C-1**.

Aquatic Exposure Pathways

The evaluated aquatic exposure pathways are as follows:

- Aquatic organisms (prey fish) – Direct contact or ingestion of contaminants in marine water.
- Marine mammals (beluga whale and Steller sea lion) – Oral ingestion of contaminants in marine water and food chain uptake of fish that may have bioaccumulated contaminants from water.

Direct contact of contaminants in marine water could occur to marine mammals; however, in comparison to exposure through oral ingestion, it is considered a minor exposure pathway and not evaluated quantitatively.

C.2.5 Assessment Endpoints and Measures

Identifying assessment endpoints and measures is critical to the risk evaluation process. These goals provide the focus of the evaluation and help to identify methodologies for the evaluation that are technically appropriate. Most importantly, they allow the ecological values of the site to be considered in risk management and regulatory processes. The assessment endpoints may be defined as any adverse effect to ecological receptors, habitats, or sensitive environments (EPA 1997). Adverse effects on these assessment endpoints are predicted from measurement endpoints, including measures of exposure and measures of effect.

The assessment endpoints for the evaluation are defined as population-level effects to aquatic organisms that could serve as the basis of beluga whale or Steller sea lion prey, and individual-level effects to beluga whales or Steller sea lions.

Measures are predictive of the assessment endpoints (EPA 1998) and can include measures of exposure, ecological effects, and ecosystem and receptor characteristics, as follows:

- Measure of exposure is a measure of dose from the co-occurrence or contact between a contaminant and an ecological receptor. This measure is referred to as the exposure point concentration (EPC) in the risk evaluation.
- Measure of effect is a measurable change in an attribute of the assessment endpoint associated with exposure to the stressor. These measures may include changes in community health, growth, and reproduction. For this evaluation, the measures of effect will be media-specific toxicity benchmarks (BMs) and dosage-based toxicity reference values (TRVs). Population-level effects are measured using chronic lowest observed adverse effect (LOAEC) and BMs for reproduction, survival, and growth endpoints. Individual-level effects are represented by no observed adverse effects levels (NOAELs) to ESA-listed species based on reproductive or growth endpoints (refer also to Section C.3.1.4)
- Measures of ecosystem and receptor characteristics are used to evaluate the ecosystem characteristics that influence the assessment endpoints, the distribution of stressors, and the characteristics of the assessment endpoints that may affect exposure or response to the stressor.

Evaluation endpoints and measures for the risk evaluation are presented in **Table C-2**.

C.2.6 Data Evaluation

Data used in this evaluation included AWPCF effluent monitoring data and fish tissue data. The sources of each dataset and the evaluation of data usability are provided in subsequent sections.

C.2.6.1 Data Sources

Effluent Concentration Data

Measured concentration of regulated and unregulated pollutants and CECs were obtained from direct concentration measurements in AWPCF effluent.

As required by the AWPCF NPDES Permit, AWWU monitors for toxic pollutants and pesticides in 24-hour composite effluent samples twice annually, typically once during early summer (dry season) and once during late summer (wet season). These toxic pollutants and pesticides are defined by the permit as those substances listed in 40 *Code of Federal Regulations* (CFR) 401.15 and include more than 130 pollutants, such as asbestos, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides, polychlorinated biphenyls (PCBs), metals, and cyanide. Pollutants detected at least once during AWPCF NPDES effluent monitoring over the period of 2015 through 2023 were identified and included for evaluation.

In addition, effluent samples were collected in 2010 and 2023 to obtain measured concentrations of contaminants of CECs in AWPCF effluent. Seven classes of CECs (pharmaceuticals and personal care products, sterols/hormones, pesticides, polybrominated diphenyl ethers [PBDEs], per- and polyfluoroalkyl substances [PFAS], nonylphenols, bisphenols, and 6-PPD quinone) were sampled to support the BE. CECs detected at least once were identified and included for evaluation. Effluent concentration data are presented in **Attachment C1**.

C.2.6.1.1 Fish Tissue Concentration Data

Measured concentrations of regulated and unregulated pollutants and CECs were obtained from direct concentration measurement taken from whole body fish tissues collected from Cook Inlet in 2024.

Whole body eulachon, Pacific cod, three-spine stickleback, and spot shrimp were collected as part of this sampling effort from seven stations within Cook Inlet as outlined in the BE. Fish tissue concentrations represent whole body concentrations and are representative of a contaminant dose that may be consumed by beluga whales or Steller sea lions. Fish tissue data are presented in **Attachment C2**.

C.2.6.2 Data Useability

All identified laboratory data were evaluated for useability and reduced for risk evaluation purposes by the following rules:

- Contaminant results with final validation qualified notes of any kind except for “not detected” or “rejected” were considered detected results.
- Estimated values (flagged with “J” or noted otherwise) were treated as detected results.
- Result values with qualifiers containing “R” or noted as rejected were omitted from the dataset.
- Native and duplicate (field or method duplicates) sample pairs were reduced as follows:
  - If there were two or more detections, the higher of the two was retained.
  - If there was one detection and one nondetect, the detected value was retained.

- If there were two nondetections, the lowest detection limit was retained.

Effluent data considered useable for the evaluation are presented in **Attachment C1**. Fish tissue data considered useable are presented in **Attachment C2**. Summary statistics for the concentrations of contaminants detected in effluent are summarized in **Table C-3**. Statistics summarizing detected concentrations from Cook Inlet fish tissue can be found in **Table C-4**.

When assessing risk through the food chain, known fish body burdens are the preferred source of EPCs because they lack some of the uncertainties associated with uptake modeling. Considering that Cook Inlet has several tributaries and is directly connected with the ocean, it receives contaminant inputs from many sources. Certain fish species that occur in Cook Inlet also migrate throughout Cook Inlet, its tributaries, and the ocean; therefore, fish tissue contaminant measurements cannot be directly attributed to contaminants detected in AWPCF effluent. For these reasons, tissue concentrations are considered to be a supplemental data source and the presence or lack of potential risk from fish tissues can be used to inform the risk description. The applicability of measured fish tissues for the risk assessment is further discussed in **Section C.4**. The following sections describe the application of the data in both exposure models.

C.3 Risk Evaluation for Prey Fish

This section evaluates the potential for effects of contaminants from AWPCF effluent on populations of aquatic organisms (that is, fish) that could serve as a food source for beluga whales and Steller sea lions. This represents one line of evidence to inform whether AWPCF effluent is likely to affect protected marine mammals by reducing the availability of prey species that serve as their primary food resources. This section is limited to addressing the potential for toxicity on prey species and not directly on beluga whales or Steller sea lions.

C.3.1 Methodology – Prey Fish

Measured concentrations of contaminants detected in AWPCF effluent were used to assess whether contaminants in the effluent could affect populations of aquatic organisms that serve as marine mammal prey species. The phased approach described in **Section C.1.3** (including a preliminary screening and a refined assessment) was used to first identify detected contaminants in effluent with the potential to create risk to prey and then to focus on contaminants with the potential to create risk under probable conditions.

Potential risks were estimated using effluent concentrations measured at the end of the pipe as well as estimated concentrations in four evaluation areas: edge of the ZID, mid-upper Cook Inlet, Knik Arm, and Turnagain Arm. The exposure scenarios evaluated for prey fish are summarized in **Table C-5** and described in the following subsections.

C.3.1.1 Exposure Areas – Prey Fish

Exposure areas represent geographic areas where data are aggregated for the computation of exposure concentrations and where independent exposure estimates are quantified. For estimating potential risk to prey species, five exposure areas were assessed (**Figure C-2):**

- **End of Pipe** – The end of the pipe was the only exposure area evaluated in the preliminary screening. This represents the point source of effluent in the three openings of the diffuser and is of negligible surface area (0.8 square meter). The end of the outfall pipe does not represent an area with viable habitat or a realistic exposure area for the identified receptors. End of pipe risk is used only in the

preliminary screening phase of the evaluation to identify chemicals to be further evaluated in the refined assessment.

- **Edge of the ZID** – The edge of the ZID was evaluated only in the refined assessment and is the area encompassed by a 350-meter radial distance from the outfall (0.257 km^2) (**Figure C-3**).
- **Knik Arm** – Knik Arm was only evaluated in the refined assessment. It is an extension of Cook Inlet branching north of Anchorage with a coverage of 278 km^2.
- **Mid Upper Cook Inlet** – Mid upper Cook Inlet was only evaluated in refined assessment. The area of the mid upper Cook Inlet is bounded by the openings into both Knik and Turnagain arms and extending out into the main Cook Inlet channel. Areal coverage is approximately 590 km^2.
- **Turnagain Arm** – Turnagain Arm was only evaluated in the refined assessment. Turnagain Arm is an extension of Cook Inlet branching south of Anchorage with a coverage of 700 km^2.

C.3.1.2 Exposure Point Concentrations – Prey Fish

The EPC represents the concentration of a contaminant to which the receptor is exposed. EPCs were determined from concentrations measured in the end-of-pipe effluent and then estimated for each exposure area (as applicable) through the application of the exposure area specific dilution factor (DF) developed in the mixing zone study (Jacobs 2024a). A DF = 1 would indicate no dilution, whereas a DF = 100 indicates the solution has been diluted by 100 times. The mixing zone study provides several scenarios considering seasonal variation, tidal swings, and AWPCF effluent discharge rates. The DFs applied to the exposure areas represent those under "critical conditions," or the lowest expected dilution under peak discharge rate. Such conditions represent a maximum risk scenario when concentrations beyond the outfall would be expected to be the highest. The DFs applied to each exposure area are presented in **Table C-5**. Inherent to the dilution modeling concept is that concentrations of potential contaminants in effluent become diluted when they mix with receiving waters. The EPCs also varied based on the phase of the evaluaiton:

- Preliminary Screening – EPCs for the preliminary screening are based on the maximum detected contaminant concentrations measured in effluent samples from AWPCF. Maximum detected concentrations measured in AWPCF effluent are presented in **Table C-6**. The preliminary screening EPCs represent the maximum concentrations that would be expected to occur in AWPCF effluent and represent an overestimation of risk but are used to identify the contaminants that require further evaluation in the refined assessment.
- Refined Assessment – The refined assessment EPCs were refined by calculating the reasonable maximum expected (RME) concentrations of contaminants. The RME concentration represents a more realistic scenario of contaminant concentrations likely to be encountered by receptors over time (EPA 2002a). As such, the RME is a refined measure for the chronic no effect exposure scenarios evaluated in this assessment. RME EPCs for the end-of-pipe effluent were calculated, including nondetect data using EPA's ProUCL software version 5.2 (EPA 2022). Treatment of nondetects in the derivation of EPCs is addressed within the ProUCL software. ProUCL output results are included as **Attachment C-3**. The RME EPCs were selected using the following rules:
  - The 95% upper confidence limit (UCL95) on the mean recommended by the ProUCL software output was selected as the refined assessment end-of-pipe effluent EPC if it was less than the maximum detected concentration.
  - If sufficient data points were not available to compute a UCL95 (typically, fewer than 5 data points), the arithmetic mean was identified as the refined assessment end-of-pipe effluent EPC.

- The maximum detected concentration was selected as the refined assessment end-of-pipe EPC if only one sample result was available or the UCL95 exceeded the maximum detected concentration.

The exposure area-specific refined assessment RME EPCs were modeled by multiplying the refined assessment end-of-pipe EPC by the exposure area-specific DF.

The preliminary screening (maximum concentrations) and refined assessment RME EPCs for contaminants detected in AWPCF effluent and modeled for each exposure area are presented in **Table C-6**.

C.3.1.3 Aquatic Toxicity Data Sources

To evaluate potential toxic effects to Cook Inlet beluga whale and Western DPS Steller sea lion prey species, chronic no effect marine surface water BMs for aquatic organisms were selected from the following sources:

- Alaska Site Specific Water Quality Criteria (SSWQC) – Aquatic life criteria for marine water in Cook Inlet (ADEC 2025). Cited for analytes that have unique water quality standards that are not based on the national criteria. If the NRWQC are the basis for the SSWQC, the NRWQC are cited. If the NRWQC is more conservative than the SSWQC, the NRWQC is used.
- Alaska State Water Quality Standards (AWQS) – Aquatic life for marine water (ADEC 2022). Cited for analytes that have unique water quality standards that are not based on the national criteria. If the NRWQC are the basis for the AWQS, the NRWQC are cited.
- National Recommended Water Quality Criteria (NRWQC) – Marine criteria chronic concentrations (CCC) (EPA 2024a). NRWQC are cited for chemicals that Alaska uses the federal values for.
- Ecological screening values for PFAS from Argonne National Laboratory (2024).
- No Effect and Low Effect BMs from Los Alamos National Laboratory (LANL) (2022).
- EPA Region 4 marine acute and chronic screening BMs (2018).

BMs for aquatic organisms are presented in **Table C-7**.

When benchmarks from these sources were not available, BMs were selected from peer-reviewed toxicology studies. Peer-reviewed literature was identified primarily through EPA's Ecotox database (EPA 2024c). When more than one toxicity study was available for a specific chemical, a prioritization scheme was used to select the most representative study. Because fish comprise the dominant mass portion of the beluga and Steller sea lion diets in Cook Inlet, this assessment selected toxicological studies demonstrating dose-effect relationships in marine fish species. When a suitable study using marine fish was not available, toxicity studies for freshwater fish or for invertebrates were considered. The toxicity study selection hierarchy used is as follows:

- Lowest marine chronic fish toxicity value
- Lowest marine acute fish toxicity value
- Lowest freshwater chronic fish toxicity value
- Lowest freshwater acute fish toxicity value
- Lowest marine chronic invertebrate toxicity value
- Lowest marine acute invertebrate toxicity value
- Lowest freshwater chronic invertebrate toxicity value
- Lowest freshwater acute invertebrate toxicity value

In accordance with standard convention for effluent toxicity testing, chronic studies were identified as studies of 7 days or greater duration. Studies with exposure duration less than 7 days were considered acute.

When a chronic BM was unavailable, an available acute threshold value was extrapolated to a chronic BM with an uncertainty factor of 10. That is, for all acute studies, the chronic BM was estimated by dividing the acute value by a factor of 10. This factor is consistent with guidance in EPA Technical Support Document for Water Quality-based Toxics Control (EPA 1991), based on evaluation of available data for acute-to-chronic ratios for multiple species and sources of exposure. The toxicity values selected from peer-reviewed literature are presented in **Table C-8**.

C.3.1.4 Calculation of Ecological Hazard Quotients for Prey Fish Exposures

The potential for risk to prey fish was estimated by calculating a hazard quotient (HQ) for each exposure area/contaminant pair. The HQ is the ratio of the EPC to the BM, and is calculated as:

$$Refinement\ HQ = \frac{EPC_i}{BM}$$

Where: $EPC_i = Effluent\ \times DF_C$

Where:

HQ	=	Refinement hazard quotient (unitless)
EPC_i	=	Exposure point concentration for marine water within exposure area$_i$ (micrograms per liter [µg/L])
Effluent	=	Concentration of contaminant at the end of pipe
DF	=	Exposure area specific dilution factor
BM	=	Chronic effects BM for prey fish

If the EPC for any exposure area/contaminant pair exceeds its chronic BM, the screening or refinement HQ (as applicable) will exceed 1. An HQ that exceeds 1 indicates that there is potential for risk of adverse effects associated with exposure to that contaminant (EPA 1998). An HQ calculated at less than or equal to 1 is considered protective of prey species, where exposure to contaminants at the EPC would not be expected to have the potential for measured effects.

C.3.2 Preliminary Screening – Prey Fish

The preliminary screening is an overestimation of risks to prey species and is limited to informing recommendations for further evaluation in the refined assessment. Recommendations made after completion of preliminary screening are as follows:

- If the results from preliminary screening do not indicate a potential for risk to prey species from direct contact with contaminants measured in effluent (screening HQ is less than 1), no further evaluation is recommended and no potential for effects in refined assessment are expected.
- If the results from preliminary screening indicate a potential for risk to prey species from direct contact with contaminants in marine water (screening HQ is equal to or greater than 1), the contaminant is recommended for further evaluation in the refined assessment.
- If the results from preliminary screening indicate there is uncertainty regarding the potential for risk to prey species from direct contact with contaminants, primarily because toxicity BMs are not available, the contaminant is carried forward to the uncertainty section.

C.3.2.1 Preliminary Screening Exposure and Toxicity Assumptions – Prey Fish

The preliminary screening was completed using overly conservative and unrealistic assumptions to evaluate the maximum risk of contaminant exposure to prey species as a preliminary screening of contaminants. The exposure and toxicity assumptions used are as follows:

- Preliminary screening was only completed for the end-of-pipe exposure area. The other exposure areas (edge of ZID, mid-upper Cook Inlet, Knik Arm, and Turnagain Arm) were evaluated in the refined assessment.
- Maximum detected concentrations of contaminants measured in end-of-pipe effluent were used as the EPCs.
- Chronic no effect BMs were used as the primary quantitative estimate of potential risk.
- BMs considered protective of aquatic organisms also are considered protective of fish that could serve as the primary basis of Cook Inlet beluga and Western DPS Steller sea lion prey.
- Both dissolved and total recoverable metals results were used to estimate risks. Differentiation of potential risk based on the most bioavailable fraction were completed in the refined assessment and in the risk description discussion.

The exposure areas and toxicity endpoints for the preliminary screening are presented in **Table C-5.** The EPCs are presented in **Table C-6**, and the toxicity values selected are presented in **Table C-7**.

C.3.2.2 Preliminary Screening Results – Prey Fish

Potential risks to prey species were estimated from contaminants measured in AWPCF effluent. The preliminary screening is presented in **Table C-9**.

End-of-Pipe Risk. The following list presents contaminants with screening HQs exceeding 1 at the end of pipe. They are summarized for 100% exposure to the maximum detected concentrations at the end of pipe:

- Metals – Copper (total and dissolved), mercury (total and dissolved), nickel (dissolved), silver (total and dissolved), zinc (total and dissolved)
- General chemistry – Total ammonia, total cyanide
- Pharmaceuticals – Diltiazem (antihypertensive)
- Pesticides – Aldrin, dieldrin, endosulfan sulfate, endrin ketone, heptachlor, malathion
- PFAS – Perfluorooctane sulfonic acid (PFOS)
- SVOCs/polycyclic aromatic hydrocarbons (PAHs) – Benzo(a)pyrene, benzo (g,h,i)perylene, bis(2-ethylhexyl)phthalate, indeno(1,2,3-c,d)pyrene, pyrene

Uncertainty. Toxicity data were not available for all detected contaminants. The following analytical groups and contaminants were identified to have uncertainty:

- Oil and Grease – Oil and grease, total (n-hexane extractable material [HEM])

C.3.2.3 Preliminary Screening Recommendations – Prey Fish

The preliminary screening recommendations for prey fish are limited to determining if additional risk evaluation is needed in the refined assessment. Risk estimates presented in preliminary screeing do not represent a realistic estimation of risk. Prey fish species would not be expected to spend the duration of

their lifespan within the confines of the area at the end of the pipe, which would be necessary for adverse chronic effects. Assuming 100% site use at the end of pipe does not provide a realistic exposure pathway.

Results from the preliminary screening are presented in **Table C-9**. Contaminants with screening HQs exceeding 1 are summarized in **Table C-10** and were recommended for further evaluation in the refined assessment.

C.3.3 Refined Assessment – Prey Fish

The refined assessment for prey fish presents a more realistic evaluation of potential risks to prey fish using the different exposure areas (**Table C-5**, **Figure C-2**). Contaminants retained after the preliminary screening were evaluated (**Table C-10**) under the refined assessment exposure and toxicity assumptions. Recommendations at the completion of the refined assessment include the following:

- If the results from refined assessment do not indicate a potential for unacceptable risk to prey species from direct contact with/ingestion of contaminants in marine water (refined HQs $\leq$ 1), the contaminants are considered to have no unacceptable risks and are not recommended for further evaluation in the BE.
- If the results from the refined assessment indicate a potential for risk to prey species from direct contact with/ingestion of contaminants in marine water (refined HQs > 1), the contaminant is recommended for further evaluation considering all lines of evidence in the risk description.
- If there is uncertainty regarding the potential for effects to prey species, the contaminant is recommended for further evaluation in the risk description and discussed in the uncertainty section.

C.3.3.1 Refined Assessment Exposure and Toxicity Assumptions – Prey Fish

The refined risk estimates were completed using more realistic exposure assumptions to evaluate the potential risk of contaminant exposure to prey fish. The refined assessment includes the following exposure and toxicity assumptions:

- The end-of-pipe RME EPC was calculated as the UCL95 concentration of contaminants detected in effluent when available (**Table C-6**). If data were limited and UCL95s could not be calculated, the mean detected concentration or maximum detected concentration was used as the end-of-pipe RME EPC.
- Exposure area specific RME EPCs were calculated by multiplying the end-of-pipe RME EPC by the respective exposure area DF (**Table C-6**).
- Chronic no effect toxicity BMs were used as the primary quantitative estimate of potential risk. BMs protective of aquatic organisms, including prey fish, that could serve as the primary basis of beluga and sea lion prey are shown in **Table C-7**.
- Both dissolved and total recoverable metals results were used to estimate risks. Differentiation of potential risk based on the most bioavailable fraction was completed in the refined assessment and in the risk description.

The principal difference between the preliminary screening and the refined assessment is the application of RME EPCs and exposure areas that could support prey species populations. The toxicity endpoints and measures used are presented in **Table C-2**, the exposure areas are shown in **Figure C-2, and** areas for each exposure area and the respective DFs are presented in **Table C-5**. Toxicity BMs are presented in **Table C-7**.

C.3.3.2 Refined Assessment Results – Prey Fish

Contaminant risk from the refined assessment for each exposure area are presented in **Table C-11**, with overall results summarized in **Table C-12**.

Exposure Area Risks to Prey Fish. The following list presents contaminants with refined HQs exceeding 1 by exposure area:

- Edge of ZID – None
- Knik Arm – None
- Mid Upper Cook Inlet – None
- Turnagain Arm – None

After the refined assessment, no contaminants detected in AWPCF effluent have HQs exceeding 1.

C.3.3.3 Refined Assessment Recommendations – Prey Fish

The refined assessment for prey fish provides context to the magnitude of potential risk and informs the risk description to make recommendations for the determinations of effects in the BE. Risk estimates for effects of contaminants to prey species indicate that there are no contaminants detected in the end-of-pipe effluent that would pose an unacceptable risk to aquatic organisms or prey fish in the ZID, Knik Arm, mid upper Cook Inlet, or Turnagain Arm exposure areas. Uncertainties based on the lack of toxicological data for oil and grease (HEM) mixtures exist; however, this contaminant category is evaluated by its components (PAHs and volatiles) because oil and grease mixtures can vary widely in composition and toxicity to aquatic organisms/fish. The results of the refined assessment are integrated into risk description in **Section C.5**.

C.4 Risk Evaluation for Marine Mammals

This section evaluates the potential for the risk of adverse effects on endangered Cook Inlet beluga whales and the Western DPS of Steller sea lions from contaminants in the AWPCF effluent stream that may bioaccumulate through the marine food chain to upper trophic-level marine mammals. This evaluation provides an additional line of evidence considered in the BE to determine if measured contaminants in effluent from the AWPCF are likely to affect these species within Cook Inlet.

C.4.1 Methodology – Marine Mammals

Potential risk to Cook Inlet beluga whales and Western DPS Steller sea lions was assessed by evaluating food chain uptake (oral consumption) of contaminants that may bioaccumulate in prey species and ultimately be consumed by these endangered species. Measured concentrations of contaminants in tissue from fish captured in Cook Inlet along with modeled concentrations in fish based on ingestion and bioaccumulation of contaminants in AWPCF effluent by their prey were used in this evaluation The phased approach described in **Section C.1.3** (including a preliminary screening and a refined assessment) was used to identify detected contaminants in end-of-pipe effluent that pose potential risk to Cook Inlet beluga whales and Western DPS Steller sea lions. The exposure and toxicity estimates then are refined to evaluate the potential for risk from uptake and bioaccumulation of these contaminants in the food chains of the ESA-listed species under probable conditions.

The exposure and toxicity assumptions for the evaluation of potential risks to marine mammals are summarized in **Table C-13** and described in the following subsections.

C.4.1.1 Exposure Areas – Marine Mammals

Exposure areas represent the geographic areas where data are aggregated for the computation of exposure concentrations and where independent exposure estimates are quantified. For estimating potential risk to Cook Inlet beluga whales and Western DPS Steller sea lions, six exposure areas were assessed (**Table C-13**, **Figure C-1**, and **Figure C-2**):

- **End of Pipe** – The end of the pipe was the only exposure area evaluated in the preliminary screening. This represents the point source of discharge in the three openings of the diffuser and is of negligible surface area (0.8 square meter). The end of the outfall pipe does not represent an area with viable habitat or a realistic exposure area for the identified receptors. End-of-pipe risk is used only in the preliminary screening phase of the evaluation to identify chemicals to be further evaluated in the refined assessment.
- **Edge of the ZID** – The edge of the ZID was evaluated only in the refined assessment and is a 350-meter radial distance from the outfall covering 0.257 km^2.
- **Knik Arm** – Knik Arm was only evaluated in the refined assessment. It is an extension of Cook Inlet branching north of Anchorage and covering 278 km^2.
- **Mid Upper Cook Inlet** – Mid upper Cook Inlet was only evaluated in the refined assessment. The area of the mid upper Cook Inlet is bound by the openings into both Knik and Turnagain arms and extends out into the main Cook Inlet channel. Areal coverage is approximately 590 km^2.
- **Turnagain Arm** – Turnagain Arm was only evaluated in the refined assessment. Turnagain Arm is an extension of Cook Inlet branching south of Anchorage covering approximately 700 km^2.
- **Cook Inlet** – Fish tissue samples collected from Cook Inlet species are evaluated as a single exposure area since movements of fish in/out of the other smaller exposure areas cannot be quantified. The entirety of Cook Inlet from the opening to the mouths of all tributaries is considered. Areal coverage is approximately 20,000 km^2. Cook Inlet fish were evaluated under both the preliminary screening and refined assessment.

C.4.1.2 Exposure Point Concentrations – Marine Mammals

The EPC represents the concentration of a contaminant to which the receptor is exposed. For marine mammal exposures, the EPCs included modeled EPCs based on concentrations measured in the end-of-pipe effluent and then estimated for each exposure area (as applicable) through the application of the exposure area specific DF developed in the mixing zone study (Jacobs 2024a) and measured EPCs for contaminants detected in fish tissues collected from Cook Inlet.

The EPCs for each phase were computed as follows:

- **Preliminary Screening** – EPCs for the preliminary screening are based on the maximum detected contaminant concentrations measured in effluent samples from AWPCF and maximum detected concentrations measured in Cook Inlet fish tissues presented in **Table C-6** and **Table C-4**, respectively. The preliminary screening EPCs represent the maximum concentrations that would be expected to occur in AWPCF effluent or fish tissue samples and represent an overestimation of risk but are used to screen contaminants. As described previously, the preliminary screening process identifies the contaminants that require further evaluation in the refined assessment.
- **Refined Assessment** – The refined assessment EPCs were refined by calculating the RME concentrations of contaminants. The RME concentration represents a more realistic scenario of contaminant concentrations likely to be encountered by receptors over time (EPA 2002a). As such, the

RME is a refined measure for the chronic no effect exposure scenarios evaluated in this assessment. RME EPCs for the end-of-pipe effluent and for Cook Inlet fish tissues were calculated using EPA's ProUCL software version 5.2 (EPA 2022). Treatment of nondetects in the derivation of EPCs is addressed within the ProUCL software. ProUCL output results are included as **Attachment C3**. The RME EPCs were selected using the following rules:

- The UCL95 on the mean recommended by the ProUCL software output was selected as the refined assessment end-of-pipe effluent EPC or Cook Inlet fish tissue EPC if it was less than the maximum detected concentration.
- If sufficient data points were not available to compute a UCL95 for effluent data, the arithmetic mean was identified as the refined assessment end-of-pipe effluent EPC.
- The maximum detected concentration was selected as the refined assessment end-of-pipe EPC or Cook Inlet fish tissue EPC if only one sample result was available or the UCL95 exceeded the maximum detected concentration. The exposure area specific refined assessment RME EPCs for marine water were modeled by multiplying the refined assessment end-of-pipe EPC by the exposure area-specific DF.

The preliminary screening (maximum detected concentrations) and the refined assessment 2 RME EPCs for contaminants detected in AWPCF effluent and modeled for each exposure area are presented in **Table C-6**. The dilution factors used and projected concentrations of contaminants in water are tabulated in **Table C-13** and **Table C-7,** respectively. The RME EPCs for fish tissues collected in Cook Inlet are presented in **Table C-4**.

C.4.1.3 Food Chain Uptake Exposure Model for Marine Mammals

The exposure model describes the relationships and equations used to estimate how much of a given chemical in a given medium is being taken up by the receptor through a given exposure route. Modeling contaminant intake is integral to estimating the potential risk from contaminant uptake through the food chain for the beluga whale and Steller sea lion. The estimated daily contaminant intake (E_{diet}) is based on receptor-specific (beluga whale or Steller sea lion) variables and is calculated as follows:

$$E_{diet} = \left(\left(\sum_{f=1}^{N} C_f \times FIR \times P_f\right) + \left(Water_j \times WIR\right)\right) \times AUF \times MF$$

Where:

C_f	=	concentration of contaminant in food (milligrams per kilogram [mg/kg])
FIR	=	daily food ingestion rate (kilograms of food per kilograms of body weight per day [$kg_{food}/kg_{bodyweight}$/day])
P_f	=	proportion of fish tissue in diet (used only for measured fish data)
WIR	=	daily water ingestion rate normalized to body weight (liters per kilogram per day [L/kg/day])
$Water_j$	=	Concentration of contaminant in water (milligrams per liter [mg/L])
AUF	=	area use factor, proportion of receptor home range to exposure area
MF	=	migration factor, proportion of time spent in exposure area

C.4.1.3.1 Concentration of Contaminants in Food

Concentrations of contaminants in food (C_f) for this evaluation include both modeled dietary fish tissue (estimated from AWPCF effluent) and measured fish tissue (collected from Cook Inlet species).

Modeled Concentrations in Food (Prey Fish). Concentrations in food (C_f) based on a diet of prey fish were modeled from maximum detected concentrations of contaminants in end-of-pipe effluent (preliminary screening) and from exposure area RME EPCs (derived for the refined assessment) using chemical-specific BCFs and food chain multipliers (FCM) for contaminants detected in AWPCF effluent. Bioaccumulation rates vary for certain contaminants at different trophic levels. Uptake of contaminants from marine water into food was calculated as follows:

$$C_f = \sum \left(\left(Water_j \times BCF_j \times FCM_{j,TL3} \times Frac_{TL3} \right) + \left(Water_j \times BCF_j \times FCM_{j,TL4} \times Frac_{TL4} \right) \right)$$

Where:

$Water_j$	=	concentration of contaminant (j) in marine water (mg/L)
BCF_j	=	bioconcentration factor for contaminant (j) (liters per kilogram [L/kg], dry weight)
$FCM_{j,\ TL3}$	=	food chain multiplier of contaminant (j) at trophic level 3 (unitless)
$FCM_{j,\ TL4}$	=	food chain multiplier of contaminant (j) at trophic level 4 (unitless)
$Frac_{TL3}$	=	fraction of receptor diet from trophic level 3
$Frac_{TL4}$	=	fraction of receptor diet from trophic level 4

Contaminant-specific BCFs were selected from peer-reviewed literature or estimated from EPA's Estimation Program Interface Suite (EPA 2019). FCMs for trophic levels 3 and 4 were obtained from Sample et al. (1996). For most inorganic compounds, the FCM was assumed to be 1 (EPA 1995) with the exception of some metals known to biomagnify. Contaminant variables used to calculate the concentration of contaminants in food are presented in **Table C-15**.

Measured Fish Tissue from Cook Inlet. Measured concentrations in fish tissue (C_f) collected from Cook Inlet provide a direct evaluation of contaminants that could be consumed by Cook Inlet belugas or Western DPS Steller sea lions. These direct measurements do not rely on the conservative uptake modeling or other assumptions used when estimating fish tissue concentrations from effluent. A disadvantage with using tissue data directly is that the measured residue levels originate from multiple sources, particularly for migratory fish, that comprise a large portion of the beluga diet. Therefore, attributing any portion potentially originating from AWPCF is not possible. However, if the levels found in fish are below levels of concern for the beluga and Steller sea lions regardless of contaminant sources, then this measure of conservatism provides an additional level of confidence in conclusions regarding AWPCF as a source.

C.4.1.3.2 Daily Food Ingestion Rates

The daily food ingestion rate (FIR) quantifies the amount of prey Cook Inlet belugas or Western DPS Steller sea lions would be expected to consume daily, averaged over time. The selection of the most conservative ingestion rate was based on the best available data to account for natural fluctuations in prey consumption. The following text details food ingestion rate determinations that were made for each receptor.

Cook Inlet Beluga Whale. Beluga whale prey consumption is highly dependent on seasonal abundance (Quakenbush et al. 2015). There is limited data quantifying the seasonal or regular prey consumption rates of Cook Inlet beluga whales based on practical difficulties in scientifically quantifying prey consumption. Most research is limited to postmortem evaluations of beluga stomach contents, which typically only provide a snapshot of the most recent feeding (Quakenbush et al. 2015). Quantifying the amount of prey consumed daily or in one feeding can be difficult from stomach contents because soft tissues and small organisms dissolve quickly (Sheffel et al. 2001) while hard or bony parts take longer to dissolve and persist in the stomach for longer durations (Jobling and Breiby 1986). Despite these

limitations, whole fish recovered from stomachs would indicate a recent feeding event and could be quantified by weight. An evaluation of stomach contents identified a limited number of beluga stomachs containing whole fish, one stomach contained 12 whole coho salmon weighing 27.8 kilograms (Quakenbush et al. 2015). Limited information was disclosed for this individual; however, if an average adult beluga whale weighs 1,428 kilograms (NOAA 2024a), this represents approximately 2% of the whale's body weight.

Beluga whales in captivity provide additional measurements of food consumption for the species. While measurements from captive animals may not reflect the energetic needs of wild specimens actively foraging and adapting to seasonal variations, food consumption rates have been quantified. Sea World (2024) reports that beluga whales in captivity consume 2.5% to 3% of their body weight per day. Kastelein et al. (1994) identified one captive female beluga (1,530 kilograms) that consumed 3.6% of her bodyweight on a daily basis. In another study, Sergeant (1969) reported captive belugas consumed an equivalent of 4% of their body weight daily but notes that these numbers are likely overestimates.

A literature review of Cook Inlet beluga whales (Norman 2011) identified bioenergetic modeling (Huntington et al. 2000) that provided further insight to Cook Inlet beluga whale food consumption. Corrected to a daily rate using a mean abundance of 350 individuals at the time of publication, it would be estimated that Cook Inlet belugas on average would consume 35 kilograms or 2.5% of their body weight per day.

Considering these variables, a daily food ingestion rate of 3% was selected from the SeaWorld (2024) source (**Table C-14**) to be used in this evaluation. This estimate on consumption considers multiple individuals and is conservative in comparison to quantities from stomach contents and those developed from bioenergetic estimates.

Western DPS Steller Sea Lion. Similar to belugas, there are limited data on prey consumption for Western DPS Steller sea lions that may forage within Cook Inlet. Estimates of Steller sea lion food consumption range from a minimum daily consumption of 4% (Trites et al. 1997) to a maximum estimate of 10% to 15% (Goldsworthy et al. 2003). The variation in food consumption can be attributed to different estimation techniques and to Steller sea lions' sexual dimorphism and behavioral differences between age classes and sex. Goldsworthy's maximum model prediction applies to young individuals < 150 kilograms who have higher energy requirements during short periods of rapid growth. Larger, mature individuals generally required less daily food intake, and males required less energy overall than females, especially those rearing young.

In captivity, long-term averages of food consumption range from 4% to 8% for Steller sea lions (Winship et al. 2006). A refined bioenergetic model developed by Winship et al. (2002) specific to Alaska's Steller sea lion population considered intersex variation and ecological variables affecting estimated food consumption to provide probable and validated food consumption estimates. This model predicts that adult Steller sea lions who are not pregnant would consume between 5% and 8% of their body weight daily.

For this evaluation, the conservative estimate of an 8% daily food ingestion rate was used and represents the maximum value for a female sea lion who is not pregnant and would be expected to require more energy in comparison to an adult male on a yearly basis (**Table C-14**).

C.4.1.3.3 Dietary Proportion of Fish

Dietary proportion of fish (P_f) is used only for measured fish tissue data. The dietary fractions of fish from trophic level 3 ($Frac_{TL3}$) or trophic level 4 ($Frac_{TL4}$) are integrated into the modeled fish tissue equation.

Both beluga whales and sea lions are known to consume both primary and secondary consumers. However, evaluation of stomach contents shows that their diets comprise primarily fish, with some individuals consuming only fish (Quakenbush et al. 2015, Trites and Calkins 2008). The consumption of primary consumers such as jellyfish was considered to be too small to reflect contaminant uptake. Therefore, this risk evaluation assumed that Cook Inlet beluga whales and Western DPS Steller sea lions only consume fish; the proportion of fish consumed was set at 1 for measured fish exposure (**Table C-14**).

Beluga whales are considered to be in trophic level 4.10 and Steller sea lions are in trophic level 3.97 (Trites 2019). As such, both are modeled as consuming trophic level 3 prey species in this evaluation.

C.4.1.3.4 Ingestion of Contaminants from Water

Both the beluga whale and Steller sea lion do not directly consume large quantities of seawater; most of their water uptake is from consuming prey species (Fetcher 1939; Ortiz 2001). Therefore, the consumption of contaminants directly from seawater was considered incidental and represents an insignificant exposure route; the water ingestion rate (WIR) was set at zero for this evaluation.

C.4.1.3.5 Area Use Factors

The area use factor (AUF) is a spatial modifier to the exposure equation and considers the receptor's home range in relation to the exposure area where they may forage. If the exposure area is larger than the organism's home range, the AUF is set to one, meaning the receptor would be expected to forage entirely within that exposure area. Both Cook Inlet beluga whales and DPS Steller sea lions are highly mobile and have seasonal movements based on prey availability and reproductive requirements. The selected home ranges, coverages of each exposure area, and resulting AUFs are presented in **Table C-14.** The AUFs were calculated as follows:

$$AUF = \frac{Exposure\ Area}{Home\ Range}$$

Where:

Exposure area = area where contaminants are evaluated (km^2)
Home range = total area where receptor resides and forages (km^2)

Cook Inlet Beluga Whale Home Range. Cook Inlet beluga whales are considered a unique population in comparison to other beluga whales. While research on the intricacies of Cook Inlet beluga movements is ongoing, this evaluation considered their home range to include all of Cook Inlet (Huntington 2000, Shelden et al. 2018) or approximately 20,000 km^2. An in-depth evaluation of Cook Inlet beluga whale movement is presented in the BE.

Steller Sea Lion Home Range. Steller sea lions have established areas of use known as haulouts and rookeries that are frequently used for resting throughout the year or during reproduction (NOAA 2024b). The spatial needs vary between males, females, and young and further deviate between breeding and nonbreeding individuals (Bishop et al. 2018). The home range for females is less than that of their male counterparts. The reported female home range of 455 km^2 was selected from Bishop et al. (2018). Female sea lions have higher energy requirements and a corresponding smaller home range than their male counterparts. Therefore, the selection of this home range is consistent with the most conservative scenario and represents the conditions in which maximum risk would be present for adult Western DPS Steller sea lions.

C.4.1.3.6 Migration Factors

The migration factor (MF) represents the proportion of time a receptor would spend within an exposure area and is used to inform the potential for risk based on different use proportions of the exposure area. The MF was set at predefined durations to provide a range of risk estimates and included a 12-month exposure (MF = 1), 9-month exposure (MF = 0.75) , 6-month exposure (MF = 0.5), and 3-month exposure (MF = 0.25).

C.4.1.4 Mammalian Toxicity Data Sources

TRVs are dosage-based effects levels and are reported as milligrams per kilogram per day (mg/kg/day). TRVs are used to estimate potential risks to mammals using the food chain uptake model. Toxicity data with measured effects specific to marine mammals for the wide range of contaminants evaluated in AWPCF effluent generally are unavailable. To evaluate potential toxic effects of contaminants to threatened and endangered species such as Cook Inlet beluga whales and Western DPS Steller sea lions, NOAEL TRVs are used to be protective of individual receptors. Oral dosage TRVs for mammals were selected from the following hierarchy of sources:

- Recommended NOAEL TRVs used to derive the EPA ecological soil screening levels (EPA 2005a, 2005b, 2005c, 2005d, 2005e, 2006, 2007a, 2007b, 2007c, 2007d, 2007e, 2007f, 2007g, 2008a)
- NOAEL TRVs for PFAS substances (Argonne National Laboratory 2024)
- No effect TRVs for birds and mammals (LANL 2022)
- Toxicological BMs for wildlife (Sample et al. 1996)
- Toxicity values provided in EPA's Integrated Risk Information System database (EPA 2024b)
- National Oceanic and Atmospheric Administration (NOAA), pharmaceuticals in the environment (NOAA 2024d)
- National Center for Biotechnology Information (NCBI) database (NCBI 2024)
- Peer-reviewed literature

Chronic, subchronic, and acute endpoints were dependent upon the test organism and study design. Generally, if the TRV was based on dosing that occurred for more than half of the test organism's expected lifespan, it was considered to be a chronic exposure. If the study and dose duration lasted more than one week but less than the majority of the organism's lifespan, it was considered to be subchronic exposure. If the dosing duration occurred for less than one week it was considered to be an acute exposure. The application of uncertainty factors, toxicity study details, evaluated endpoints, and final TRVs are presented in **Table C-16**.

C.4.1.5 Calculation of Ecological Hazard Quotients for Marine Mammal Exposures

The potential for risk to beluga and sea lion from food chain uptake of contaminants was estimated by calculating a dose-based HQ for each contaminant. The HQ is calculated as the ratio of the contaminant dose per day to the dose-based TRV, as follows:

$$HQ = \frac{E_{diet}}{TRV}$$

Where:

HQ = ecological hazard quotient (unitless)

E_{diet} = estimated daily dietary intake of the contaminant per kilogram of bodyweight (milligrams per kilogram of bodyweight per day [mg/kgbw/day])
TRV = toxicity reference value (mg/kgbw/day)

If the daily dietary intake for any contaminant exceeds its TRV, the HQ will exceed unity (1). An HQ that exceeds unity indicates that there is potential for risk of effects associated with exposure to that contaminant. An HQ calculated to be less than or equal to 1 is considered protective of prey species, where exposure to contaminants at the EPC would not be expected to have the potential for measured effects. Separate risk estimates were developed for the Cook Inlet beluga and Steller sea lion based on both modeled and measured dietary fish concentrations. The modeling and selection of variables for daily contaminant intake is provided in **Table C-13**. Results of the risk estimations are presented in the following sections.

C.4.2 Preliminary Screening – Marine Mammals

The preliminary risk screening is an overestimation of potential risks to Cook Inlet beluga whales and Western DPS Steller sea lions and is limited to identifying contaminants with the potential for risk that require further evaluation in the refined assessment. Recommendations made after completion of preliminary screening are as follows:

- If the results from preliminary screening do not indicate a potential risk to beluga whales and Steller sea lions from food chain uptake of contaminants measured in effluent (screening HQ is < 1), no further evaluation is recommended and no potential for effects in under the refined assessment assumptions are expected.
- If the results from preliminary screening indicate a potential for risk to beluga whales and Steller sea lions from food chain uptake of contaminants measured in effluent (screening HQ is ≥1), the contaminant is recommended for further evaluation in the refined assessment.
- If the results from preliminary screening indicate there is uncertainty about the potential for risk to beluga whales and Steller sea lions from food chain uptake of contaminants measured in effluent, primarily because toxicity BMs are not available, the contaminant is carried forward to the uncertainty section.

C.4.2.1 Preliminary Screening Exposure and Toxicity Assumptions – Marine Mammals

The preliminary screening risk estimates were completed using overly conservative assumptions to identify contaminants that may have potential risk to beluga whales and Steller sea lions. The exposure and toxicity assumptions used are summarized as follows:

- Preliminary screening was only completed for the end of pipe measured fish data – modeled fish data and for Cook Inlet. The other exposure areas evaluated using modeled fish data included edge of ZID, mid-upper Cook Inlet, Knik Arm, and Turnagain Arm and were only evaluated in the refined assessment.
- Maximum concentrations of contaminants detected in end-of-pipe effluent data were used at the EPC for estimating uptake, bioaccumulation, and potential risks to marine mammals using modeled fish data.
- Food chain uptake exposures were developed for beluga whales and Steller sea lions using the methodology detailed in **Section C.4.1**.
- Maximum concentrations of contaminants detected in fish tissue were used as the EPC for food chain uptake from Cook Inlet fish.

- Chronic no effect toxicity values (TRVs) were used as the primary quantitative estimate of potential risk. TRVs protective of terrestrial mammals are assumed to also be protective of marine mammals under the assumption that the digestive and metabolic functions are similar.
- 100% site use by beluga whales and Steller sea lions in each exposure area was assumed (AUF = 1)
- Beluga whales and Steller sea lions reside in each exposure area for 100% of the year (MF = 1)
- Belugas and Steller sea lions consume only fish, uptake from lower trophic organisms is incidental.
- Belugas and Steller sea lions do not drink appreciable amounts of seawater; uptake of contaminants directly from water is insignificant.

The exposure areas and toxicity endpoints for the preliminary screening are presented in **Table C-2**, the data used in the evaluation are presented in **Table C-5**, receptor variables specific to the beluga whale and Steller sea lion are presented in **Table C-14**, the exposure areas and DFs are presented in **Table C-13**, and the dose-based toxicity values selected are presented in **Table C-16**.

C.4.2.2 Preliminary Screening Results – Marine Mammals

Potential risks to Cook Inlet beluga whales and Western DPS Steller sea lions were estimated from contaminants detected in AWPCF effluent and measured in Cook Inlet fish tissues. preliminary screening HQs are presented in **Table C-17**.

End-of-Pipe Modeled Dietary Risk. Contaminants with screening HQs exceeding 1 based on modeled food chain uptake from prey fish tissue that had bioaccumulated contaminants from AWPCF effluent modeled are as follows:

- Beluga Whale
  - PAHs – benz(a)anthracene, benzo(e)pyrene
  - PBDEs - 2,2',4,4',5-PeBDE (BDE-99); 2,2',4,4'-TeBDE (BDE-47)
  - SVOCs - bis(2-ethylhexyl) phthalate
- Steller Sea Lion
  - PAH – benz(a)anthracene, benzo(a)pyrene, benzo(e)pyrene, perylene
  - PBDEs – 2,2',4,4',5-PeBDE (BDE-99); 2,2',4,4',6-PeBDE; 2,2',4,4'-TeBDE (BDE-47); 2,2',4,5'-TeBDE; 2,3',4,4'-TeBDE
  - Pesticides – 4,4'-DDD; 4,4'-DDE; aldrin; dieldrin
  - SVOCs – bis(2-ethylhexyl)phthalate, di-n-octyl phthalate, n-nitrosodimethylamine

Cook Inlet Measured Fish Dietary Risk. Contaminants detected in fish collected from Cook Inlet and used to estimate exposure and risk to marine mammals are summarized as follows:

- Beluga Whale
  - SVOCs – n-nitrosodimethylamine
- Steller Sea Lion
  - SVOCs – n-nitrosodimethylamine

Uncertainty. Toxicity data were not available for all detected contaminants. The following analytical groups and contaminants were identified to have uncertainty:

- Ammonia – total ammonia
- Pharmaceuticals/hormones/personal care products/steroids – 1,7-dimethylxanthine; 10-hydroxy-amitriptyline; 1,2-diphenylhydrazine; dehydronifedipine; desmethyldiltiazem; equilenin; estrone; glipizide; norfluoxetine; paroxetine; prednisone; ranitidine; sertraline; valsartan
- Oil and grease – oil and grease, total (HEM)
- PFAS – PFHpA, PFPeA, PFPeS
- VOCs – chloroethane

C.4.2.3 Preliminary Screening Recommendations – Marine Mammals

The preliminary screening recommendations are limited to determining if additional risk evaluation is needed in the refined assessment and do not represent a realistic estimation of risk. Cook Inlet beluga whales and Western DPS Steller sea lions would not live and forage exclusively from the area at the end of the pipe. Additionally, their primary prey species would not be expected to spend their lifespans foraging directly at the end of the pipe. Assume 100% site use at the end of pipe violates one of the key requirements of risk assessments considering the end of pipe does not provide suitable habitat for a complete realistic exposure pathway.

Results from the preliminary screening are presented in **Table C-17** and chemicals with screening HQs exceeding 1 are summarized in **Table C-19** for Cook Inlet beluga whales and Western DPS Steller sea lions for modeled and measured dietary uptake of prey fish**.** These chemical/receptor pairs are recommended for further evaluation in refined assessment.

C.4.3 Refined Assessment – Marine Mammals

The refined assessment presents a more realistic scenario of contaminant concentrations likely to be consumed by Cook Inlet beluga whales or Western DPS Steller sea lions that may be exposed to contaminants in AWPCF effluent in each exposure area (**Figure C-1** and **Figure C-2**) under the refined assessment assumptions. The potential recommendations for contaminants made after completion of refined assessment are as follows:

- If the results from refined assessment do not indicate a potential for unacceptable risk to Cook Inlet beluga whales or Western DPS Steller sea lions from food chain uptake of contaminants (refined HQs ≤ 1), the contaminants are considered to have no unacceptable risks and are not recommended for further evaluation in this BE.
- If the results from refined assessment indicate a potential for risk to Cook Inlet beluga whales or Steller sea lions from food chain uptake of contaminants (refined HQs > 1), the contaminant is recommended for further evaluation considering all lines of evidence in the risk description.
- If there is uncertainty regarding the potential for effects to the beluga whale or Steller Sea lion, the contaminant is recommended for further evaluation in the risk description and discussed in the uncertainty section.

C.4.3.1 Refined Assessment Exposure and Toxicity Assumptions – Marine Mammals

The refined risk estimates were completed using more realistic exposure assumptions to evaluate the potential risk of contaminants to belugas and sea lions from food chain uptake. The refined assessment exposure and toxicity assumptions are as follows:

- Refined risk estimates for modeled dietary fish consumed by beluga whales and sea lions were evaluated using modeled dietary fish concentrations for each exposure area (edge of ZID, mid-upper Cook Inlet, Knik Arm, and Turnagain Arm). The UCL95 concentrations for modeled dietary fish were estimated using end-of-pipe effluent RME EPCs modified by the DFs for each exposure area. If data were limited and UCL95s could not be calculated, the maximum detected concentration was used as the RME EPC. The RME EPCs for effluent in each exposure area were used in the food chain uptake model to estimate the corresponding RME concentrations in dietary fish.
- Refined risk estimates for measured fish tissue consumed by beluga whales and sea lions were evaluated using the UCL95 of fish collected from Cook Inlet where data were available. If sufficient data were not available to compute the UCL95, the maximum detected concentrations in fish tissue were used in the exposure model for marine mammals.
- Food chain uptake exposures were developed for beluga whales and Steller sea lions using the methodology detailed in **Section C.4.1**.
- Chronic no effect TRVs were used as the quantitative estimate of potential risk. TRVs protective of terrestrial mammals are protective of marine mammals under the assumption that the digestive and metabolic functions are similar.
- Receptor-specific AUFs were calculated for each exposure area and applied to the refined assessment exposure estimates. Receptor home ranges and AUFs are presented in **Table C-14**.
- Migration factors were generalized between both evaluated species at 12-month, 9-month, 6-month, and 3-month durations within each exposure area.
- Belugas and Steller sea lions consume only fish; uptake from lower trophic organisms is incidental.
- Belugas and Steller sea lions do not drink appreciable amounts of seawater; uptake of contaminants directly from water is insignificant.

The exposure scenarios evaluated in the Tier2 risk refinement are presented in **Table C-13.** The effluent data used to model dietary fish concentrations are presented in **Table C-3**. The fish tissue data used directly in the food chain uptake model were presented in **Table C-4**. The receptor exposure factors specific to the beluga whale and Steller sea lion are presented in **Table C-14.** The dosage-based TRVs are presented in **Table C-16**.

C.4.3.2 Refined Assessment Results – Marine Mammals

Potential risks to Cook Inlet beluga whale and Steller sea lion were estimated from contaminants in AWPCF effluent and from fish tissue collected from Cook Inlet. Potential contaminant risks from the refined assessment are presented in **Table C-19** and summarized in **Table C-20**.

Modeled Dietary Risk – Edge of ZID. Contaminants with refined HQs exceeding 1 based on modeled food chain uptake from prey fish tissue that had bioaccumulated contaminants from AWPCF effluent at the edge of the ZID are summarized as follows for each exposure duration:

- Beluga Whale
  - 12-month exposure – none

  - 9-month exposure – none
  - 6-month exposure – none
  - 3-month exposure – none
- Steller Sea Lion
  - 12-month exposure – none
  - 9-month exposure – none
  - 6-month exposure – none
  - 3-month exposure – none

Modeled Dietary Risk – Knik Arm. Contaminants with refined HQs exceeding 1 based on modeled food chain uptake from prey fish tissue that had bioaccumulated contaminants from AWPCF effluent in the Knik Arm are summarized for each exposure duration:

- Beluga Whale
  - 12-month exposure – none
  - 9-month exposure – none
  - 6-month exposure – none
  - 3-month exposure – none
- Steller Sea Lion
  - 12-month exposure – none
  - 9-month exposure – none
  - 6-month exposure – none
  - 3-month exposure – none

Modeled Dietary Risk – Mid-Upper Cook Inlet. Contaminants with refined HQs exceeding 1 based on modeled food chain uptake from prey fish tissue that had bioaccumulated contaminants from AWPCF effluent in mid-upper Cook Inlet are summarized for each exposure duration:

- Beluga Whale
  - 12-month exposure – none
  - 9-month exposure – none
  - 6-month exposure – none
  - 3-month exposure – none
- Steller Sea Lion
  - 12-month exposure – none
  - 9-month exposure – none
  - 6-month exposure – none
  - 3-month exposure – none

Modeled Dietary Risk – Turnagain Arm. Contaminants with refined HQs exceeding 1 based on modeled food chain uptake from prey fish tissue that had bioaccumulated contaminants from AWPCF effluent in Turnagain Arm are summarized for each exposure duration:

- Beluga Whale
  - 12-month exposure – none

  - 9-month exposure – none
  - 6-month exposure – none
  - 3-month exposure – none
- Steller Sea Lion
  - 12-month exposure – none
  - 9-month exposure – none
  - 6-month exposure – none
  - 3-month exposure – none

Measured Fish Dietary Risk – Cook Inlet. Contaminants detected in fish collected from Cook Inlet and used to estimate exposure and risk to marine mammals are summarized for each exposure duration:

- Beluga Whale
  - 12-month exposure – none
  - 9-month exposure – none
  - 6-month exposure – none
  - 3-month exposure – none
- Steller Sea Lion
  - 12-month exposure – n-nitrosodimethylamine
  - 9-month exposure – n-nitrosodimethylamine
  - 6-month exposure – none
  - 3-month exposure – none

C.4.3.3 Refined Assessment Recommendations – Marine Mammals

The refined assessment provides quantitative risk estimates and informs the risk description to make recommendations for the determinations of effect in the BE. The results of the refined assessment for modeled or measured fish tissue concentrations are presented in **Table C-20** and summarized as follows:

- **Modeled Dietary Uptake** – No contaminants were found to pose risk to Cook Inlet beluga whales or Western DPS Steller sea lions potentially using the ZID, Knik Arm, mid-upper Cook Inlet, or Turnagain Arm exposure areas under any of the exposure durations evaluated, including 3-month, 6-month, 9-month, and 12-month exposures.
- **Measured Dietary Uptake** – Only one contaminant was found to pose a potential for adverse effects to the Steller sea lion based on measured fish tissue data for Cook Inlet. n-Nitrosodimethylamine had refined HQs exceeding 1 for Western DPS Steller sea lions under both 9-month and 12-month exposure durations only. No estimated risks were identified for the 3-month or 6-month exposure durations that are considered more likely. There were no contaminants with potential for adverse effects to Cook Inlet beluga whales or Steller sea lions using measured fish tissue data for any of the exposure durations.
- **Uncertainties** – Toxicological data were not available for certain PFAS, VOC, and CEC compounds. The results of the refined assessment are integrated into the risk description for the risk evaluation in **Section C.5**.

C.5 Risk Description

Not all risk estimates with HQs exceeding 1 are ultimately ecologically meaningful. The risk description evaluates the lines of evidence supporting or refuting the risk estimates and an interpretation of the significance of potential risk identified in the various exposure scenarios and endpoints specific to the risk evaluation. The overall weight of evidence incorporating the conclusions of the risk evaluation along with other lines of evidence for the BE is presented in the main text of the BE (refer to Section 5 of the BE).

C.5.1 Ecological Risk Lines of Evidence

The following lines of evidence were considered in the risk description for each receptor (prey species, beluga whale, sea lion) for each detected contaminant.

- Exposure risk estimates
- End-of-pipe exposures
- Contaminant dilution factors
- Endangered species behavior and resource distribution
- Uncertainties and limitations
- Current and potential future conditions in Cook Inlet

Consideration of Risk Estimates. Chemical-specific risk estimates are the primary quantitative line of evidence in identifying risk drivers, sensitive receptors, and extent of potential risk to receptors evaluated for this risk evaluation. Risk estimates were calculated for aquatic organisms (marine mammal prey species), Cook Inlet beluga whale, and Steller sea lion exposure pathways. Contaminants with HQs that do not exceed 1 at the No Effect level generally are considered to not pose a potential risk to the receptor group evaluated. Those with HQs exceeding 1 at the No Effect level indicate a potential for toxicity and risk and additional lines of evidence are used to further understand the potential for risk and reduce uncertainty.

Considerations for End-of-Pipe Exposures. Quantitative risk estimates (HQs) at the end-of-pipe exposure area assumed any receptor would spend 100% of its lifespan in this location. The end-of-pipe exposure area does not provide suitable habitat or reasonable areal coverage to support prey species or Cook Inlet beluga whale and Western DPS Steller sea lion foraging. Therefore, this exposure scenario is unrealistic for providing ecologically meaningful results. However, it was included as requested by the reviewing agencies to support the preliminary screening to identify contaminants that may pose adverse effects to prey fish and marine mammals. Contaminants exceeding the conservative exposure assumptions for the preliminary screening at the end of pipe were retained for further evaluation in the refined assessment.

Consideration of Contaminant Dilution. Exposure area-specific DFs were developed as part of the Outfall Mixing Zone Study (Jacobs 2024a). The end-of-pipe contaminant concentrations were adjusted by the exposure area DFs to provide perspective of contaminants that had dispersed to other areas of Cook Inlet. Mixing within the ZID occurs rapidly and, under worst-case conditions, a DF of 109 is achieved in less than 10 minutes at any point 350 meters from the outfall. Under average annual dry season conditions, a DF of more than 2x (DF = 240) is achieved in approximately 4 minutes at 350 meters from the diffuser (Jacobs 2024a). The rapid dilution, marginal habitat availability, limited prey abundance, and spatial use requirements of the receptors validates the determination that the end-of-pipe exposure area is not ecologically meaningful.

Consideration of Endangered Species. The basis of this risk evaluation is to be protective of endangered Cook Inlet DPS beluga whales and the Western DPS Steller sea lions that may transit through the action area and are known to occur within upper Cook Inlet. The recommendations made in this risk evaluation

will be used to establish ESA Section 7-compliant determinations of effect relating to these species. Conservative assumptions made in the risk assessment regarding receptor-specific variables for the species results in the potential for overestimation of risk.

Consideration of Uncertainties and Limitations. Uncertainties are inherent in all risk assessments/ evaluations because of the limitations of the available data and the need to make certain assumptions and extrapolations based on incomplete information. Potential uncertainties and limitations include data, exposure assumptions, exposure models, toxicity and bioavailability, and risk estimation. The uncertainties and limitations considered during this evaluation are presented in **Table C-21** with an indication of the potential magnitude of the uncertainty and whether it may result in an underestimation or overestimation of potential exposure and risk.

- **Exposure Models**. The use of various models (for example, uptake and food web exposures) carries with it some associated uncertainty as to how well the model reflects actual conditions. Because conservative assumptions generally are used throughout the exposure and effects evaluations, these uncertainties are more likely to result in an overestimation rather than an underestimation of risks to ecological receptors. Uncertainties in potential exposures include the estimation of bioaccumulation into prey species and use of AUFs. Bioaccumulation of contaminants into prey species can vary widely among sites based on changes in ambient conditions. Bioaccumulation is estimated using literature-based BAFs and uptake regressions. AUFs are based on the foraging ranges of the receptor obtained from the literature and may not represent individuals that may defy trends or changing conditions. The actual foraging ranges may be larger or smaller based on site-specific conditions, including habitat quality, prey availability, or other uses. The most conservative foraging ranges were used but this may also result in an overestimation of risk.
- **Toxicity Assumptions**. Uncertainties in toxicity BMs and TRVs include use of modeled toxicity BMs, surrogate chemicals, and uncertainty factors applied. Uncertainty factors are used to estimate an unknown endpoint from a known endpoint and may be overly conservative based on differences in study design and receptor. Contaminants for which toxicity BMs and TRVs were not available for all receptor groups include oil and grease, total ammonia, some PFAS compounds, and CECs. Oil and grease as mixtures typically are not evaluated in risk assessments since mixtures within a given category can have considerable variation in overall composition. Anthropogenic hydrocarbon-related contamination is evaluated based on individual chemical components (PAHs, and others). Ecological toxicity of PFAS is a rapidly changing science, so toxicity BMs and TRVs were not available for all detected PFAS. Potential risks from PFAS were evaluated using the best available information. CECs without TRVs include some pharmaceuticals, pharmaceutical metabolites, and personal care products. Available literature was evaluated to identify valid toxicity exposures for these contaminants and no available or validated data were identified. There is uncertainty in determining the potential toxicity of these contaminants from oral uptake. Quarterly whole effluent toxicity testing indicates low toxicity for the sea urchin test species. Sea urchin fertilization test methods are considered highly sensitive and evaluate the aggregate toxicity of contaminants in effluent. Sea urchin fertilization tests can indicate potential toxicity from environmentally relevant concentrations of contaminants such as estrogens (Roepke et al. 2005), PFAS (Hayman et al. 2021), and other contaminants that often occur in mixtures. While the potential effects of contaminants without toxicity data are uncertain, potential effects are not likely when aggregate toxicity is evaluated.

Consideration of Current and Potential Future Conditions in Cook Inlet. Contaminants in AWPCF effluent originate from both domestic and nondomestic sources. The assessment assumes a steady state of contaminants represented by the dataset used in this evaluation. Infrastructure or land use changes upstream of AWPCF could increase or reduce contaminant concentrations in AWPCF effluent. Changes to the industrial manufacture, use, and disposal of contaminants or municipal uses and disposal of

pharmaceuticals/personal care products may change contaminant concentrations in AWPCF effluent over time, which introduces uncertainty.

C.5.2 Risk Evaluation Conclusions

This risk evaluation quantitatively and qualitatively evaluated potential risks to prey species, Cook Inlet beluga whales, and Western DPS Steller sea lions from exposure to contaminants detected in AWPCF effluent with the objective of providing recommendations to be used in the BE for ESA Section 7 determinations of effect. The risk evaluation was conducted in general accordance with EPA guidance and consideration of ADEC guidance. Potential risks were estimated for receptors and exposure pathways based on available data and a current understanding of the Cook Inlet ecosystem and the behaviors of prey species, Cook Inlet beluga whales, and Western DPS Steller sea lions. The qualitative and quantitative lines of evidence supporting the overall conclusions of the risk evaluation are presented in **Table C-22**, and conclusions from the evaluation and recommendations for each scenario are presented in the following subsections and in **Table C-23.**

Potential for Adverse Effects to Prey Species

Potential for risk to key prey species for the Cook Inlet beluga whale and Steller sea lion from contaminant concentrations in AWPCF effluent was evaluated. Risk from contaminant concentrations measured at the end of pipe and modeled at the edge of the ZID, mid-upper Cook Inlet, Knik Arm, and Turnagain Arm were compared to No Effect toxicity data protective of aquatic organisms to determine if concentrations could affect prey species integral to endangered marine mammal health. After evaluation in the risk description, no contaminants detected in AWPCF effluent are likely to pose risk to prey species.

Potential for Adverse Effects to Cook Inlet Beluga Whale

Potential for risk to Cook Inlet beluga whales from the bioaccumulation of contaminants detected in AWPCF effluent was evaluated. Contaminant concentrations in modeled and measured fish were compared to No Effect oral dose toxicity data to estimate the potential for risk. After evaluation in the risk description, no contaminants detected in AWPCF effluent are likely to pose risk to Cook Inlet beluga whales through food chain uptake.

Potential for Adverse Effects to Steller Sea Lion

Potential for risk to Steller sea lions from the bioaccumulation of contaminants detected in AWPCF effluent was evaluated. Contaminant concentrations in modeled and measured fish were compared to No Effect oral dose toxicity data to estimate the potential for risk. After evaluation in the risk description, no contaminants detected in AWPCF effluent are likely to pose risk to Western DPS Steller sea lions through food chain uptake.

C.6 References

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Tables

Table C-1. Species Considered for Evaluation in Cook Inlet
AWWU Ecological Risk Evaluation

Common Name	Scientific Name
Primary Beluga Prey Fish*	
pink salmon	*Oncorhynchus gorbuscha*
chum salmon	*Oncorhynchus keta*
coho salmon	*Oncorhynchus kisutch*
sockeye salmon	*Oncorhynchus nerka*
saffron cod	*Eleginus gracilis*
Pacific cod	*Gadus macrocephalus*
Pacific eulachon	*Thaleichthys pacificus*
walleye pollock	*Gadus chalcogrammus*
starry flounder	*Platichthys stellatus*
yellowfin sole	*Lamanda aspera*
Pacific staghorn sculpin	*Leptocottus armatus*
threespined stickleback	*Gasterosteus aculeatus*
Marine Mammals	
Cook Inlet Beluga Whale	*Delphinapterus leucas*
Stellar Sea Lion	*Eumetopias jubatus*

Note:
*Beluga prey fish include but are not limited to the listed species discussed in the 2025 BE (Jacobs, 2025).

Table C-2. Evaluation Endpoints and Measures
AWWU Ecological Risk Evaluation

Receptor Group	Representative Receptors	Assessment Endpoint	Measures of Exposure	Measures of Effect
Aquatic Exposure Pathways				
Beluga Prey Species	Marine Aquatic Organisms	Protect beluga prey fish by limiting adverse effects from exposure to pollutants in effluents.	Measured concentrations of pollutants in effluent.	Comparison of concentrations to chronic tissue based effects benchmarks.
Food-Chain Bioaccumulation Pathway				
Beluga Whales Stellar Sea Lion	Marine Mammals	Protect Cook Inlet belugas and stellar sea lions by preventing adverse effects from exposure to pollutants accumulating in fish tissues.	Measured and modeled concentrations of pollutants in fish tissues.	Comparison of biotic media concentrations to no observed adverse effect level (NOAEL)-based benchmarks.

Table C-3. Summary Statistics - Effluent

AWWU Ecological Risk Evaluation

Location	Matrix	Chemical Group	Analyte	CAS	Units	Number of Samples	Number of Detects	Percent Detection	Minimum Non-Detect	Maximum Non-Detect	Minimum Detect	Maximum Detect	Mean	95% UCL	95% UCL Basis	RME EPC[a]	EPC Basis
AWWU Outfall	Effluent	Metals	Antimony	7440-36-0	ug/L	54	54	100%	--	--	0.53	0.904	0.66	0.678	95% Student's-t UCL	0.678	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Arsenic	7440-38-2	ug/L	62	62	100%	--	--	0.962	3.42	2.476	2.587	95% Student's-t UCL	2.587	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Beryllium	7440-41-7	ug/L	54	23	43%	0.005	0.008	0.004	0.018	0.00891	0.00696	95% KM (t) UCL	0.00696	95% KM (t) UCL
AWWU Outfall	Effluent	Metals	Cadmium	7440-43-9	ug/L	62	62	100%	--	--	0.081	0.309	0.192	0.2	95% Student's-t UCL	0.2	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Chromium	7440-47-3	ug/L	63	62	98%	1.7	1.7	0.496	3.46	1.752	1.854	95% KM (t) UCL	1.854	95% KM (t) UCL
AWWU Outfall	Effluent	Metals	Copper	7440-50-8	ug/L	62	62	100%	--	--	11.6	115	37.34	40.27	95% Student's-t UCL	40.27	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Dissolved Antimony	7440-36-0	ug/L	54	54	100%	--	--	0.448	0.806	0.562	0.579	95% Student's-t UCL	0.579	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Dissolved Arsenic	7440-38-2	ug/L	63	63	100%	--	--	0.596	2.78	2.127	2.229	95% Student's-t UCL	2.229	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Dissolved Beryllium	7440-41-7	ug/L	54	5	9%	0.002	0.008	0.002	0.004	0.003	0.00321	95% KM (t) UCL	0.00321	95% KM (t) UCL
AWWU Outfall	Effluent	Metals	Dissolved Cadmium	7440-43-9	ug/L	63	63	100%	--	--	0.042	0.21	0.11	0.118	95% Student's-t UCL	0.118	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Dissolved Chromium	7440-47-3	ug/L	62	60	97%	0.04	1.7	0.24	3.63	1.078	1.184	95% KM Approximate Gamma UCL	1.184	95% KM Approximate Gamma UCL
AWWU Outfall	Effluent	Metals	Dissolved Copper	7440-50-8	ug/L	63	63	100%	--	--	4.86	41.8	20.41	21.95	95% Student's-t UCL	21.95	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Dissolved Lead	7439-92-1	ug/L	63	63	100%	--	--	0.177	1.54	0.718	0.786	95% Student's-t UCL	0.786	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Dissolved Mercury	7439-97-6	ug/L	62	61	98%	0.00205	0.00205	0.00053	0.0894	0.0143	0.0174	95% KM Approximate Gamma UCL	0.0174	95% KM Approximate Gamma UCL
AWWU Outfall	Effluent	Metals	Dissolved Molybdenum	7439-98-7	ug/L	54	54	100%	--	--	1.33	47.6	4.002	4.237	95% H-UCL	4.237	95% H-UCL
AWWU Outfall	Effluent	Metals	Dissolved Nickel	7440-02-0	ug/L	63	63	100%	--	--	0.136	9.49	3.941	4.254	95% Student's-t UCL	4.254	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Dissolved Selenium	7782-49-2	ug/L	55	55	100%	--	--	0.136	1	0.65	0.685	95% Student's-t UCL	0.685	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Dissolved Silver	7440-22-4	ug/L	63	59	94%	0.017	0.05	0.023	0.422	0.109	0.128	KM H-UCL	0.128	KM H-UCL
AWWU Outfall	Effluent	Metals	Dissolved Thallium	7440-28-0	ug/L	54	4	7%	0.002	0.009	0.013	0.032	0.0213	0.00485	95% KM (t) UCL	0.00485	95% KM (t) UCL
AWWU Outfall	Effluent	Metals	Dissolved Zinc	7440-66-6	ug/L	63	63	100%	--	--	16.8	124	65.66	69.6	95% Student's-t UCL	69.6	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Lead	7439-92-1	ug/L	62	62	100%	--	--	0.782	4.8	1.802	1.942	95% Student's-t UCL	1.942	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Mercury	7439-97-6	ug/L	63	63	100%	--	--	0.00649	0.114	0.0285	0.0316	95% Student's-t UCL	0.0316	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Molybdenum	7439-98-7	ug/L	54	54	100%	--	--	1.51	48.7	4.276	4.521	95% H-UCL	4.521	95% H-UCL
AWWU Outfall	Effluent	Metals	Nickel	7440-02-0	ug/L	62	62	100%	--	--	1.07	6.7	4.334	4.597	95% Student's-t UCL	4.597	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Selenium	7782-49-2	ug/L	54	54	100%	--	--	0.5	1.2	0.811	0.848	95% Student's-t UCL	0.848	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Silver	7440-22-4	ug/L	62	62	100%	--	--	0.096	0.49	0.234	0.254	95% Student's-t UCL	0.254	95% Student's-t UCL
AWWU Outfall	Effluent	Metals	Thallium	7440-28-0	ug/L	54	17	31%	0.002	0.009	0.003	0.052	0.0139	0.00812	95% KM (t) UCL	0.00812	95% KM (t) UCL
AWWU Outfall	Effluent	Metals	Zinc	7440-66-6	ug/L	62	62	100%	--	--	57.2	165	103.5	108.1	95% Student's-t UCL	108.1	95% Student's-t UCL
AWWU Outfall	Effluent	ACE inhibitor	Enalapril	75847-73-3	ug/L	2	2	100%	--	--	0.00595	0.0121	0.00903	--	--	0.00903	Mean
AWWU Outfall	Effluent	Amine	Total Ammonia	7664-41-7	ug/L	60	60	100%	--	--	19,700	33,000	26,002	26,694	95% Student's-t UCL	26,694	95% Student's-t UCL
AWWU Outfall	Effluent	Anabolic agent	Androstenedione	63-05-8	ug/L	1	1	100%	--	--	0.162	0.162	0.162	--	--	0.162	Mean
AWWU Outfall	Effluent	Analgesic	Ibuprofen	15687-27-1	ug/L	2	2	100%	--	--	8.15	20.9	14.53	--	--	14.53	Mean
AWWU Outfall	Effluent	Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	51146-55-5	ug/L	1	1	100%	--	--	38.7	38.7	38.7	--	--	38.7	Mean
AWWU Outfall	Effluent	Anti-acid reflux	Ranitidine	66357-35-5	ug/L	2	1	50%	0.00298	0.00298	0.0844	0.0844	0.0844	--	--	0.0844	Mean
AWWU Outfall	Effluent	Antiasthmatic	Albuterol	18559-94-9	ug/L	2	2	100%	--	--	0.0145	0.0201	0.0173	--	--	0.0173	Mean
AWWU Outfall	Effluent	Antiasthmatic	Theophylline	58-55-9	ug/L	2	2	100%	--	--	48.4	51.1	49.75	--	--	49.75	Mean
AWWU Outfall	Effluent	Antibacterial	Penicillin V	87-08-1	ug/L	2	1	50%	0.00149	0.00149	0.0134	0.0134	0.0134	--	--	0.0134	Mean
AWWU Outfall	Effluent	Antibiotic	4-Epitetracycline [ETC]	23313-80-6	ug/L	1	1	100%	--	--	0.0662	0.0662	0.0662	--	--	0.0662	Mean
AWWU Outfall	Effluent	Antibiotic	Enrofloxacin	93106-60-6	ug/L	2	1	50%	0.003	0.003	0.000708	0.000708	0.000708	--	--	7.08E-04	Mean
AWWU Outfall	Effluent	Anticonvulsant	Benztropine	86-13-5	ug/L	2	1	50%	0.000695	0.000695	0.00105	0.00105	0.00105	--	--	0.00105	Mean
AWWU Outfall	Effluent	Anticonvulsant	Carbamazepine	298-46-4	ug/L	2	2	100%	--	--	0.112	0.506	0.309	--	--	0.309	Mean
AWWU Outfall	Effluent	Antidepressant	10-hydroxy-amitriptyline	1159-82-6	ug/L	2	2	100%	--	--	0.0113	0.0192	0.0153	--	--	0.0153	Mean
AWWU Outfall	Effluent	Antidepressant	Amitriptyline	50-48-6	ug/L	2	2	100%	--	--	0.0294	0.0746	0.052	--	--	0.052	Mean
AWWU Outfall	Effluent	Antidiabetic drug	Glipizide	29094-61-9	ug/L	2	2	100%	--	--	0.00458	0.0107	0.00764	--	--	0.00764	Mean
AWWU Outfall	Effluent	Antidiabetic drug	Glyburide	10238-21-8	ug/L	2	1	50%	0.00238	0.00238	0.0185	0.0185	0.0185	--	--	0.0185	Mean
AWWU Outfall	Effluent	Antidiabetic drug	Metformin	657-24-9	ug/L	2	2	100%	--	--	45.9	89.3	67.6	--	--	67.6	Mean
AWWU Outfall	Effluent	Antifungal agent	Miconazole	22916-47-8	ug/L	2	2	100%	--	--	0.00197	0.0562	0.0291	--	--	0.0291	Mean
AWWU Outfall	Effluent	Antihistamine	Diphenhydramine	58-73-1	ug/L	2	2	100%	--	--	0.593	1.68	1.137	--	--	1.137	Mean
AWWU Outfall	Effluent	Antihistamine	Promethazine	60-87-7	ug/L	2	1	50%	0.00232	0.00232	0.0335	0.0335	0.0335	--	--	0.0335	Mean
AWWU Outfall	Effluent	Antihypertensive	Diltiazem	42399-41-7	ug/L	2	2	100%	--	--	0.0961	0.406	0.251	--	--	0.251	Mean
AWWU Outfall	Effluent	Antihypertensive	Valsartan	137862-53-4	ug/L	2	2	100%	--	--	2.48	15.8	9.14	--	--	9.14	Mean
AWWU Outfall	Effluent	Antihypertensive	Verapamil	52-53-9	ug/L	2	2	100%	--	--	0.0103	0.0512	0.0308	--	--	0.0308	Mean
AWWU Outfall	Effluent	Antilipemic	Gemfibrozil	25812-30-0	ug/L	2	2	100%	--	--	0.183	1.33	0.757	--	--	0.757	Mean
AWWU Outfall	Effluent	Antimicrobial, disinfectant	Triclocarban	101-20-2	ug/L	1	1	100%	--	--	0.00489	0.00489	0.00489	--	--	0.00489	Mean
AWWU Outfall	Effluent	Antimicrobial, disinfectant	Triclosan	3380-34-5	ug/L	2	1	50%	0.0179	0.0179	4.31	4.31	4.31	--	--	4.31	Mean
AWWU Outfall	Effluent	Antipyretic, analgesic	Acetaminophen	103-90-2	ug/L	2	2	100%	--	--	67.5	122	94.75	--	--	94.75	Mean
AWWU Outfall	Effluent	Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	611-59-6	ug/L	2	2	100%	--	--	16.2	57.8	37	--	--	37	Mean
AWWU Outfall	Effluent	Betablocker	Atenolol	29122-68-7	ug/L	2	2	100%	--	--	0.381	1.88	1.131	--	--	1.131	Mean
AWWU Outfall	Effluent	Betablocker	Metoprolol	51384-51-1	ug/L	2	2	100%	--	--	0.46	0.489	0.475	--	--	0.475	Mean
AWWU Outfall	Effluent	Betablocker	Propranolol	525-66-6	ug/L	2	2	100%	--	--	0.0611	0.0748	0.068	--	--	0.068	Mean
AWWU Outfall	Effluent	BloodThinner	Warfarin	81-81-2	ug/L	2	1	50%	0.00119	0.00119	0.00403	0.00403	0.00403	--	--	0.00403	Mean
AWWU Outfall	Effluent	ChannelBlocker	Amlodipine	88150-42-9	ug/L	2	2	100%	--	--	0.0188	0.0248	0.0218	--	--	0.0218	Mean
AWWU Outfall	Effluent	ChannelBlocker	Dehydronifedipine	67035-22-7	ug/L	2	1	50%	0.00129	0.00129	0.0014	0.0014	0.0014	--	--	0.0014	Mean
AWWU Outfall	Effluent	ChannelBlocker	Desmethyldiltiazem	42399-41-7	ug/L	2	2	100%	--	--	0.0302	0.0836	0.0569	--	--	0.0569	Mean
AWWU Outfall	Effluent	ChannelBlocker	Norverapamil	67018-85-3	ug/L	2	2	100%	--	--	0.00595	0.0189	0.0124	--	--	0.0124	Mean
AWWU Outfall	Effluent	Cocaine metabolite	Benzoylecgonine	519-09-5	ug/L	2	2	100%	--	--	1.92	1.96	1.94	--	--	1.94	Mean
AWWU Outfall	Effluent	Contraceptive	Norgestrel	6533-00-2	ug/L	1	1	100%	--	--	0.0818	0.0818	0.0818	--	--	0.0818	Mean
AWWU Outfall	Effluent	Corticosteroid	Hydrocortisone	50-23-7	ug/L	2	2	100%	--	--	0.207	0.782	0.495	--	--	0.495	Mean

Table C-3. Summary Statistics - Effluent

AWWU Ecological Risk Evaluation

Location	Matrix	Chemical Group	Analyte	CAS	Units	Number of Samples	Number of Detects	Percent Detection	Minimum Non-Detect	Maximum Non-Detect	Minimum Detect	Maximum Detect	Mean	95% UCL	95% UCL Basis	RME EPC[a]	EPC Basis
AWWU Outfall	Effluent	Cyanide	Cyanide, Total	57-12-5	ug/L	60	26	43%	0.3	0.9	0.0006	9	1.992	1.338	95% KM (t) UCL	1.338	95% KM (t) UCL
AWWU Outfall	Effluent	Depressant	Alprazolam	28981-97-7	ug/L	2	2	100%	--	--	0.000871	0.00323	0.00205	--	--	0.00205	Mean
AWWU Outfall	Effluent	Depressant	Diazepam	439-14-5	ug/L	1	1	100%	--	--	0.000827	0.000827	0.000827	--	--	8.27E-04	Mean
AWWU Outfall	Effluent	Diuretic	Furosemide	54-31-9	ug/L	2	2	100%	--	--	0.202	0.208	0.205	--	--	0.205	Mean
AWWU Outfall	Effluent	Diuretic	Hydrochlorothiazide	58-93-5	ug/L	2	2	100%	--	--	0.355	1.07	0.713	--	--	0.713	Mean
AWWU Outfall	Effluent	Diuretic	Triamterene	396-01-0	ug/L	2	2	100%	--	--	0.0349	0.0941	0.0645	--	--	0.0645	Mean
AWWU Outfall	Effluent	Fungicide and parasiticide	Thiabendazole	148-79-8	ug/L	2	2	100%	--	--	0.024	0.0306	0.0273	--	--	0.0273	Mean
AWWU Outfall	Effluent	Glycoside	Digoxin	20830-75-5	ug/L	2	1	50%	0.00764	0.00764	0.0701	0.0701	0.0701	--	--	0.0701	Mean
AWWU Outfall	Effluent	Lincosamide antibiotic	Lincomycin	154-21-2	ug/L	2	2	100%	--	--	0.00436	0.0435	0.0239	--	--	0.0239	Mean
AWWU Outfall	Effluent	Macrolide antibiotic	Azithromycin	83905-01-5	ug/L	2	2	100%	--	--	0.112	0.341	0.227	--	--	0.227	Mean
AWWU Outfall	Effluent	Macrolide antibiotic	Clarithromycin	81103-11-9	ug/L	2	2	100%	--	--	0.0407	0.165	0.103	--	--	0.103	Mean
AWWU Outfall	Effluent	Macrolide antibiotic	Erythromycin-H2O	114-07-8	ug/L	2	2	100%	--	--	0.012	0.168	0.09	--	--	0.09	Mean
AWWU Outfall	Effluent	Macrolide antibiotic	Roxithromycin	80214-83-1	ug/L	2	1	50%	0.000288	0.000288	0.000941	0.000941	0.000941	--	--	9.41E-04	Mean
AWWU Outfall	Effluent	Macrolide antibiotic	Tylosin	1401-69-0	ug/L	2	1	50%	0.00576	0.00576	0.00143	0.00143	0.00143	--	--	0.00143	Mean
AWWU Outfall	Effluent	Nicotinemetabolite	Cotinine	486-56-6	ug/L	2	2	100%	--	--	2.1	2.8	2.45	--	--	2.45	Mean
AWWU Outfall	Effluent	Non-steroidalanti-inflammatory drug	Naproxen	22204-53-1	ug/L	2	2	100%	--	--	6.25	12.4	9.325	--	--	9.325	Mean
AWWU Outfall	Effluent	Oil & Grease	Oil and Grease, Total (HEM)	--	ug/L	18	18	100%	--	--	12,500	42,700	28,272	32,012	95% Student's-t UCL	32,012	95% Student's-t UCL
AWWU Outfall	Effluent	Opiate	Codeine	76-57-3	ug/L	2	2	100%	--	--	0.0583	0.152	0.105	--	--	0.105	Mean
AWWU Outfall	Effluent	Opiate	Hydrocodone	125-29-1	ug/L	2	2	100%	--	--	0.0259	0.0687	0.0473	--	--	0.0473	Mean
AWWU Outfall	Effluent	Opiate	Oxycodone	76-42-6	ug/L	2	2	100%	--	--	0.0559	0.16	0.108	--	--	0.108	Mean
AWWU Outfall	Effluent	Opiod	Propoxyphene	469-62-5	ug/L	2	1	50%	0.000298	0.000298	0.0102	0.0102	0.0102	--	--	0.0102	Mean
AWWU Outfall	Effluent	PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-20	1163-19-5	ug/L	1	1	100%	--	--	0.0258	0.0258	0.0258	--	--	0.0258	Mean
AWWU Outfall	Effluent	PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	32534-81-9	ug/L	1	1	100%	--	--	0.00524	0.00524	0.00524	--	--	0.00524	Mean
AWWU Outfall	Effluent	PBDEs	2,2',3,4,4',5,5',6-OcBDE	337513-72-1	ug/L	1	1	100%	--	--	0.00141	0.00141	0.00141	--	--	0.00141	Mean
AWWU Outfall	Effluent	PBDEs	2,2',3,4,4',5',6-HpBDE	207122-16-5	ug/L	1	1	100%	--	--	0.000687	0.000687	0.000687	--	--	6.87E-04	Mean
AWWU Outfall	Effluent	PBDEs	2,2',3,4,4',5'-HxBDE	182677-30-1	ug/L	1	1	100%	--	--	0.000494	0.000494	0.000494	--	--	4.94E-04	Mean
AWWU Outfall	Effluent	PBDEs	2,2',3,4,4',6'-HxBDE	243982-83-4	ug/L	1	1	100%	--	--	0.000154	0.000154	0.000154	--	--	1.54E-04	Mean
AWWU Outfall	Effluent	PBDEs	2,2',3,4,4'-PeBDE	182346-21-0	ug/L	1	1	100%	--	--	0.00182	0.00182	0.00182	--	--	0.00182	Mean
AWWU Outfall	Effluent	PBDEs	2,2',4,4',5,5'-HxBDE	68631-49-2	ug/L	1	1	100%	--	--	0.0036	0.0036	0.0036	--	--	0.0036	Mean
AWWU Outfall	Effluent	PBDEs	2,2',4,4',5,6'-HxBDE	207122-15-4	ug/L	1	1	100%	--	--	0.00305	0.00305	0.00305	--	--	0.00305	Mean
AWWU Outfall	Effluent	PBDEs	2,2',4,4',5-PeBDE (BDE-99)	60348-60-9	ug/L	1	1	100%	--	--	0.0406	0.0406	0.0406	--	--	0.0406	Mean
AWWU Outfall	Effluent	PBDEs	2,2',4,4',6,6'-HxBDE	35854-94-5	ug/L	1	1	100%	--	--	0.000213	0.000213	0.000213	--	--	2.13E-04	Mean
AWWU Outfall	Effluent	PBDEs	2,2',4,4',6-PeBDE	189084-64-8	ug/L	1	1	100%	--	--	0.00811	0.00811	0.00811	--	--	0.00811	Mean
AWWU Outfall	Effluent	PBDEs	2,2',4,4'-TeBDE (BDE-47)	5436-43-1	ug/L	1	1	100%	--	--	0.0432	0.0432	0.0432	--	--	0.0432	Mean
AWWU Outfall	Effluent	PBDEs	2,2',4,5'-TeBDE	243982-82-3	ug/L	1	1	100%	--	--	0.00156	0.00156	0.00156	--	--	0.00156	Mean
AWWU Outfall	Effluent	PBDEs	2,2',4,6'-TeBDE	189084-57-9	ug/L	1	1	100%	--	--	0.00024	0.00024	0.00024	--	--	2.40E-04	Mean
AWWU Outfall	Effluent	PBDEs	2,2',4-TriBDE	147217-75-2	ug/L	1	1	100%	--	--	0.00111	0.00111	0.00111	--	--	0.00111	Mean
AWWU Outfall	Effluent	PBDEs	2,3',4,4',6-PeBDE	189084-66-0	ug/L	1	1	100%	--	--	0.000202	0.000202	0.000202	--	--	2.02E-04	Mean
AWWU Outfall	Effluent	PBDEs	2,3',4,4'-TeBDE	189084-61-5	ug/L	1	1	100%	--	--	0.0015	0.0015	0.0015	--	--	0.0015	Mean
AWWU Outfall	Effluent	PBDEs	2,3',4',6-TeBDE	189084-62-6	ug/L	1	1	100%	--	--	0.000558	0.000558	0.000558	--	--	5.58E-04	Mean
AWWU Outfall	Effluent	PBDEs	2,4,4'-TriBDE	41318-75-6	ug/L	1	1	100%	--	--	0.00135	0.00135	0.00135	--	--	0.00135	Mean
AWWU Outfall	Effluent	Pesticides	2,4'-DDD	53-19-0	ug/L	1	1	100%	--	--	0.00107	0.00107	0.00107	--	--	0.00107	Mean
AWWU Outfall	Effluent	Pesticides	4,4'-DDD	72-54-8	ug/L	18	3	17%	0.003	0.056	0.0049	0.021	0.0104	0.00762	95% KM (t) UCL	0.00762	95% KM (t) UCL
AWWU Outfall	Effluent	Pesticides	4,4'-DDE	72-55-9	ug/L	18	3	17%	0.0028	0.056	0.0021	0.0047	0.00297	0.00338	95% KM (t) UCL	0.00338	95% KM (t) UCL
AWWU Outfall	Effluent	Pesticides	4,4'-DDT	50-29-3	ug/L	1	1	100%	--	--	0.000186	0.000186	0.000186	--	--	1.86E-04	Mean
AWWU Outfall	Effluent	Pesticides	Aldrin	309-00-2	ug/L	18	2	11%	0.00041	0.092	0.0068	0.0097	0.00825	0.00395	95% KM (t) UCL	0.00395	95% KM (t) UCL
AWWU Outfall	Effluent	Pesticides	Chlordane, alpha (cis)	5103-71-9	ug/L	1	1	100%	--	--	0.000142	0.000142	0.000142	--	--	1.42E-04	Mean
AWWU Outfall	Effluent	Pesticides	Chlorpyriphos	2921-88-2	ug/L	1	1	100%	--	--	0.000972	0.000972	0.000972	--	--	9.72E-04	Mean
AWWU Outfall	Effluent	Pesticides	Chlorpyriphos-Methyl	5598-13-0	ug/L	1	1	100%	--	--	0.000211	0.000211	0.000211	--	--	2.11E-04	Mean
AWWU Outfall	Effluent	Pesticides	Cypermethrin	52315-07-8	ug/L	1	1	100%	--	--	0.00405	0.00405	0.00405	--	--	0.00405	Mean
AWWU Outfall	Effluent	Pesticides	DEET	134-62-3	ug/L	2	2	100%	--	--	3.65	6.36	5.005	--	--	5.005	Mean
AWWU Outfall	Effluent	Pesticides	Demeton-O,S	126-75-0	ug/L	18	1	6%	0.027	2.9	0.038	0.038	0.038	N/A	The data set for variable Demeton-	0.038	Max Detect
AWWU Outfall	Effluent	Pesticides	Dieldrin	60-57-1	ug/L	18	2	11%	0.00036	0.056	0.0088	0.014	0.0114	0.00522	95% KM (t) UCL	0.00522	95% KM (t) UCL
AWWU Outfall	Effluent	Pesticides	Endosulfan Sulfate	1031-07-8	ug/L	18	1	6%	0.00049	0.056	0.022	0.022	0.022	N/A	The data set for variable Endosulfan	0.022	Max Detect
AWWU Outfall	Effluent	Pesticides	Endrin	72-20-8	ug/L	1	1	100%	--	--	0.000062	0.000062	0.000062	--	--	6.20E-05	Mean
AWWU Outfall	Effluent	Pesticides	Endrin Ketone	53494-70-5	ug/L	18	1	6%	0.0049	0.056	0.0096	0.0096	0.0096	N/A	The data set for variable Endrin	0.0096	Max Detect
AWWU Outfall	Effluent	Pesticides	HCH, alpha	319-84-6	ug/L	1	1	100%	--	--	0.000066	0.000066	0.000066	--	--	6.60E-05	Mean
AWWU Outfall	Effluent	Pesticides	HCH, beta	319-85-7	ug/L	1	1	100%	--	--	0.000109	0.000109	0.000109	--	--	1.09E-04	Mean
AWWU Outfall	Effluent	Pesticides	HCH, gamma	58-89-9	ug/L	1	1	100%	--	--	0.000696	0.000696	0.000696	--	--	6.96E-04	Mean
AWWU Outfall	Effluent	Pesticides	Heptachlor	76-44-8	ug/L	18	1	6%	0.00036	0.056	0.014	0.014	0.014	N/A	The data set for variable Heptachlor	0.014	Max Detect
AWWU Outfall	Effluent	Pesticides	Hexachlorobenzene	118-74-1	ug/L	1	1	100%	--	--	0.000517	0.000517	0.000517	--	--	5.17E-04	Mean
AWWU Outfall	Effluent	Pesticides	Malathion	121-75-5	ug/L	18	6	33%	0.005	2.8	0.01	0.52	0.0977	0.101	95% KM (t) UCL	0.101	95% KM (t) UCL
AWWU Outfall	Effluent	Pesticides	Methoxychlor	72-43-5	ug/L	18	1	6%	0.00093	0.056	0.0029	0.0029	0.0029	N/A	The data set for variable	0.0029	Max Detect
AWWU Outfall	Effluent	Pesticides	Permethrin	52645-53-1	ug/L	1	1	100%	--	--	0.0423	0.0423	0.0423	--	--	0.0423	Mean
AWWU Outfall	Effluent	PFAS	5:3 FTCA	1799325-94-2	ug/L	1	1	100%	--	--	0.0592	0.0592	0.0592	--	--	0.0592	Mean
AWWU Outfall	Effluent	PFAS	PFBA	375-22-4	ug/L	2	2	100%	--	--	0.00504	0.0149	0.00997	--	--	0.00997	Mean
AWWU Outfall	Effluent	PFAS	PFHpA	375-85-9	ug/L	2	2	100%	--	--	0.00721	0.00847	0.00784	--	--	0.00784	Mean
AWWU Outfall	Effluent	PFAS	PFHxA	307-24-4	ug/L	2	2	100%	--	--	0.0228	0.0255	0.0242	--	--	0.0242	Mean

Table C-3. Summary Statistics - Effluent

AWWU Ecological Risk Evaluation

Location	Matrix	Chemical Group	Analyte	CAS	Units	Number of Samples	Number of Detects	Percent Detection	Minimum Non-Detect	Maximum Non-Detect	Minimum Detect	Maximum Detect	Mean	95% UCL	95% UCL Basis	RME EPC[a]	EPC Basis
AWWU Outfall	Effluent	PFAS	PFHxS	355-46-4	ug/L	2	2	100%	--	--	0.0255	0.0396	0.0326	--	--	0.0326	Mean
AWWU Outfall	Effluent	PFAS	PFNA	375-95-1	ug/L	2	2	100%	--	--	0.00268	0.00514	0.00391	--	--	0.00391	Mean
AWWU Outfall	Effluent	PFAS	PFOA	335-67-1	ug/L	2	2	100%	--	--	0.0173	0.0185	0.0179	--	--	0.0179	Mean
AWWU Outfall	Effluent	PFAS	PFOS	1763-23-1	ug/L	2	2	100%	--	--	0.024	0.0653	0.0447	--	--	0.0447	Mean
AWWU Outfall	Effluent	PFAS	PFPeA	2706-90-3	ug/L	2	2	100%	--	--	0.00878	0.0203	0.0145	--	--	0.0145	Mean
AWWU Outfall	Effluent	PFAS	PFPeS	175905-36-9	ug/L	1	1	100%	--	--	0.00384	0.00384	0.00384	--	--	0.00384	Mean
AWWU Outfall	Effluent	Plasticizer	Bisphenol A	80-05-7	ug/L	3	3	100%	--	--	0.55	1.59	1.143	2.046	95% Student's-t UCL	1.59	Max Detect[1]
AWWU Outfall	Effluent	Plasticizer	Bisphenol S	80-09-1	ug/L	1	1	100%	--	--	0.888	0.888	0.888	--	--	0.888	Mean
AWWU Outfall	Effluent	Pyrimidine antibiotic	Trimethoprim	738-70-5	ug/L	2	2	100%	--	--	0.294	0.711	0.503	--	--	0.503	Mean
AWWU Outfall	Effluent	Quinoline antibiotic	Ciprofloxacin	85721-33-1	ug/L	2	2	100%	--	--	0.102	0.372	0.237	--	--	0.237	Mean
AWWU Outfall	Effluent	Quinoline antibiotic	Ofloxacin	82419-36-1	ug/L	2	2	100%	--	--	0.0879	0.427	0.257	--	--	0.257	Mean
AWWU Outfall	Effluent	Rubber Stabilizing compound	6PPD-Quinone	2754428-18-5	ug/L	1	1	100%	--	--	0.0053	0.0053	0.0053	--	--	0.0053	Mean
AWWU Outfall	Effluent	Sex hormone	17 beta-Estradiol	50-28-2	ug/L	1	1	100%	--	--	0.00552	0.00552	0.00552	--	--	0.00552	Maximum Detect
AWWU Outfall	Effluent	Sex hormone	Estrone	53-16-7	ug/L	1	1	100%	--	--	0.0331	0.0331	0.0331	--	--	0.0331	Mean
AWWU Outfall	Effluent	Sex hormone	Progesterone	57-83-0	ug/L	1	1	100%	--	--	0.0566	0.0566	0.0566	--	--	0.0566	Mean
AWWU Outfall	Effluent	Sex hormone	Testosterone	58-22-0	ug/L	1	1	100%	--	--	0.0717	0.0717	0.0717	--	--	0.0717	Mean
AWWU Outfall	Effluent	SSRI Antidepressant	Fluoxetine	54910-89-3	ug/L	2	2	100%	--	--	0.0286	0.052	0.0403	--	--	0.0403	Mean
AWWU Outfall	Effluent	SSRI Antidepressant	Norfluoxetine	83891-03-6	ug/L	2	2	100%	--	--	0.00789	0.0273	0.0176	--	--	0.0176	Mean
AWWU Outfall	Effluent	SSRI Antidepressant	Paroxetine	61869-08-7	ug/L	2	2	100%	--	--	0.00352	0.0188	0.0112	--	--	0.0112	Mean
AWWU Outfall	Effluent	SSRI Antidepressant	Sertraline	79617-96-2	ug/L	2	2	100%	--	--	0.0483	0.108	0.0782	--	--	0.0782	Mean
AWWU Outfall	Effluent	Statin	Atorvastatin	134523-00-5	ug/L	2	2	100%	--	--	0.0604	0.22	0.14	--	--	0.14	Mean
AWWU Outfall	Effluent	Steroid	Methylprednisolone	83-43-2	ug/L	2	1	50%	0.00397	0.00397	0.113	0.113	0.113	--	--	0.113	Mean
AWWU Outfall	Effluent	Steroid	Prednisolone	50-24-8	ug/L	2	1	50%	0.00576	0.00576	0.00931	0.00931	0.00931	--	--	0.00931	Mean
AWWU Outfall	Effluent	Steroidal Estrogen	Equilenin	517-09-9	ug/L	1	1	100%	--	--	0.0134	0.0134	0.0134	--	--	0.0134	Mean
AWWU Outfall	Effluent	Stimulant	Amphetamine	300-62-9	ug/L	2	2	100%	--	--	0.304	0.539	0.422	--	--	0.422	Mean
AWWU Outfall	Effluent	Stimulant	Caffeine	58-08-2	ug/L	2	2	100%	--	--	45.1	105	75.05	--	--	75.05	Mean
AWWU Outfall	Effluent	Stimulant	Cocaine	50-36-2	ug/L	2	2	100%	--	--	0.568	0.768	0.668	--	--	0.668	Mean
AWWU Outfall	Effluent	Streoid	Prednisone	53-03-2	ug/L	2	2	100%	--	--	0.00729	0.404	0.206	--	--	0.206	Mean
AWWU Outfall	Effluent	Sulfonamide antibiotic	Sulfadiazine	68-35-9	ug/L	2	1	50%	0.00144	0.00144	0.00146	0.00146	0.00146	--	--	0.00146	Mean
AWWU Outfall	Effluent	Sulfonamide antibiotic	Sulfamethizole	144-82-1	ug/L	2	1	50%	0.00101	0.00101	0.00511	0.00511	0.00511	--	--	0.00511	Mean
AWWU Outfall	Effluent	Sulfonamide antibiotic	Sulfamethoxazole	723-46-6	ug/L	2	2	100%	--	--	0.416	1.08	0.748	--	--	0.748	Mean
AWWU Outfall	Effluent	Sulfonamide antibiotic	Sulfanilamide	63-74-1	ug/L	2	2	100%	--	--	0.0323	0.0348	0.0336	--	--	0.0336	Mean
AWWU Outfall	Effluent	SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	ug/L	15	2	13%	0.11	6.19	1.1	2.5	1.8	0.867	95% KM (t) UCL	0.867	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7	ug/L	9	9	100%	--	--	0.00797	0.1	0.0291	--	No UCL Recommendation	0.1	Max Detect
AWWU Outfall	Effluent	SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4	ug/L	9	8	89%	0.00096569	0.00096569	0.00264	0.05	0.0165	0.0359	95% KM Adjusted Gamma UCL	0.0359	95% KM Adjusted Gamma UCL
AWWU Outfall	Effluent	SVOCs/PAHs	1-Methylfluorene	1730-37-6	ug/L	9	9	100%	--	--	0.0129	0.05	0.0231	0.0301	95% Student's-t UCL	0.0301	95% Student's-t UCL
AWWU Outfall	Effluent	SVOCs/PAHs	1-Methylnaphthalene	90-12-0	ug/L	9	9	100%	--	--	0.0444	0.427	0.103	--	No UCL Recommendation	0.427	Max Detect
AWWU Outfall	Effluent	SVOCs/PAHs	1-Methylphenanthrene	832-69-9	ug/L	9	9	100%	--	--	0.015	0.0285	0.0208	0.0231	95% Student's-t UCL	0.0231	95% Student's-t UCL
AWWU Outfall	Effluent	SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	ug/L	15	6	40%	0.38	7.5	0.59	1.2	0.91	1.008	95% KM (t) UCL	1.008	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0	ug/L	9	9	100%	--	--	0.0219	0.344	0.0849	--	No UCL Recommendation	0.344	Max Detect
AWWU Outfall	Effluent	SVOCs/PAHs	2-Methylanthracene	613-12-7	ug/L	9	9	100%	--	--	0.00425	0.0636	0.013	--	No UCL Recommendation	0.0636	Max Detect
AWWU Outfall	Effluent	SVOCs/PAHs	2-Methylfluoranthene	33543-31-6	ug/L	9	9	100%	--	--	0.00644	0.0174	0.0107	0.013	95% Student's-t UCL	0.013	95% Student's-t UCL
AWWU Outfall	Effluent	SVOCs/PAHs	2-Methylnaphthalene	91-57-6	ug/L	9	9	100%	--	--	0.0561	0.541	0.134	--	No UCL Recommendation	0.541	Max Detect
AWWU Outfall	Effluent	SVOCs/PAHs	2-Methylphenanthrene	2531-84-2	ug/L	9	9	100%	--	--	0.026	0.0647	0.0412	0.0491	95% Student's-t UCL	0.0491	95% Student's-t UCL
AWWU Outfall	Effluent	SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6	ug/L	9	9	100%	--	--	0.00546	0.0189	0.0101	0.0128	95% Student's-t UCL	0.0128	95% Student's-t UCL
AWWU Outfall	Effluent	SVOCs/PAHs	3-Methylphenanthrene	832-71-3	ug/L	9	9	100%	--	--	0.0245	0.0579	0.0391	0.0456	95% Student's-t UCL	0.0456	95% Student's-t UCL
AWWU Outfall	Effluent	SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5	ug/L	9	8	89%	0.00096569	0.00096569	0.00802	0.0229	0.0129	0.0154	95% KM (t) UCL	0.0154	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Acenaphthene	83-32-9	ug/L	27	9	33%	0.13	420	0.0314	0.0821	0.0587	0.0693	95% KM (t) UCL	0.0693	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Acenaphthylene	208-96-8	ug/L	27	7	26%	0.00117	99	0.0024	0.0125	0.00751	0.00868	95% KM (t) UCL	0.00868	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Anthracene	120-12-7	ug/L	27	9	33%	0.12	160	0.0202	0.0553	0.0381	0.0444	95% KM (t) UCL	0.0444	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Benz(a)anthracene	56-55-3	ug/L	24	10	42%	0.09	5.16	0.0224	0.25	0.0607	0.0817	95% KM (t) UCL	0.0817	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2	ug/L	9	6	67%	0.00251	0.00251	0.00217	0.0151	0.00862	0.00967	95% KM (t) UCL	0.00967	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Benzo(a)pyrene	50-32-8	ug/L	27	9	33%	0.16	120	0.00912	0.0563	0.0239	0.0322	95% KM (t) UCL	0.0322	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	ug/L	27	9	33%	0.085	100	0.0109	0.049	0.025	0.033	95% KM (t) UCL	0.033	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Benzo(b)fluorene	243-17-4	ug/L	9	9	100%	--	--	0.0102	0.0406	0.0199	0.0261	95% Student's-t UCL	0.0261	95% Student's-t UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Benzo(e)pyrene	192-97-2	ug/L	9	7	78%	0.00269	0.00269	0.0117	0.0523	0.0253	0.0301	95% KM (t) UCL	0.0301	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	ug/L	27	5	19%	0.00251	140	0.0059	0.0833	0.0334	0.036	95% KM (t) UCL	0.036	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9	ug/L	9	9	100%	--	--	0.00783	0.0334	0.0164	0.0213	95% Student's-t UCL	0.0213	95% Student's-t UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Benzothiophene	95-15-8	ug/L	9	4	44%	0.00129	0.00129	0.00288	0.0144	0.00715	0.00683	95% KM (t) UCL	0.00683	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Biphenyl	92-52-4	ug/L	9	9	100%	--	--	0.023	0.102	0.0475	--	No UCL Recommendation	0.102	Max Detect
AWWU Outfall	Effluent	SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	ug/L	18	11	61%	1.7	150	4.3	95	21.88	27.62	95% KM (t) UCL	27.62	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	ug/L	15	8	53%	2.8	20	1.2	5.62	2.165	3.017	95% KM Adjusted Gamma UCL	3.017	95% KM Adjusted Gamma UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Carbazole	86-74-8	ug/L	9	9	100%	--	--	0.0478	0.201	0.123	0.157	95% Student's-t UCL	0.157	95% Student's-t UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Chrysene/Triphenylene	218-01-9, 217-59-4	ug/L	9	9	100%	--	--	0.0224	0.0614	0.0364	0.0449	95% Student's-t UCL	0.0449	95% Student's-t UCL
AWWU Outfall	Effluent	SVOCs/PAHs	cis/trans Decalin	493-01-6	ug/L	9	9	100%	--	--	0.227	0.484	0.351	0.405	95% Student's-t UCL	0.405	95% Student's-t UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	ug/L	27	2	7%	0.00114	150	0.00529	0.00668	0.00598	0.00385	95% KM (t) UCL	0.00385	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Dibenzofuran	132-64-9	ug/L	9	9	100%	--	--	0.00921	0.0698	0.0401	0.0511	95% Student's-t UCL	0.0511	95% Student's-t UCL

Table C-3. Summary Statistics - Effluent

AWWU Ecological Risk Evaluation

Location	Matrix	Chemical Group	Analyte	CAS	Units	Number of Samples	Number of Detects	Percent Detection	Minimum Non-Detect	Maximum Non-Detect	Minimum Detect	Maximum Detect	Mean	95% UCL	95% UCL Basis	RME EPC[a]	EPC Basis
AWWU Outfall	Effluent	SVOCs/PAHs	Dibenzothiophene	132-65-0	ug/L	9	9	100%	--	--	0.0182	0.0335	0.0251	0.0285	95% Student's-t UCL	0.0285	95% Student's-t UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Diethyl Phthalate	84-66-2	ug/L	18	13	72%	1.3	170	1.5	3.7	2.492	2.725	95% KM (t) UCL	2.725	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Dimethyl Phthalate	131-11-3	ug/L	15	1	7%	0.21	6.71	0.12	0.12	0.12	N/A	The data set for variable Dimethyl	0.12	Max Detect
AWWU Outfall	Effluent	SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	ug/L	18	5	28%	0.46	220	0.36	0.84	0.64	0.744	95% KM (t) UCL	0.744	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	ug/L	15	2	13%	0.17	3.3	1.5	18.9	10.2	4.555	95% KM (t) UCL	4.555	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Fluoranthene	206-44-0	ug/L	27	11	41%	0.45	140	0.112	0.317	0.185	0.218	95% KM (t) UCL	0.218	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Fluorene	86-73-7	ug/L	27	9	33%	0.14	84	0.0455	0.126	0.0828	0.097	95% KM (t) UCL	0.097	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	ug/L	27	3	11%	0.00139	170	0.00566	0.0444	0.0259	0.0198	95% KM (t) UCL	0.0198	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Isophorone	78-59-1	ug/L	18	1	6%	0.08	180	0.38	0.38	0.38	N/A	The data set for variable Isophorone	0.38	Max Detect
AWWU Outfall	Effluent	SVOCs/PAHs	Naphthalene	91-20-3	ug/L	27	10	37%	0.11	53	0.102	0.98	0.234	0.25	95% KM (t) UCL	0.25	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Naphthobenzothiophene	205-43-6	ug/L	9	7	78%	0.00103	0.00103	0.0127	0.0337	0.0192	0.0216	95% KM (t) UCL	0.0216	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	ug/L	15	1	7%	1.7	8.5	9.6	9.6	9.6	N/A	The data set for variable N-	9.6	Max Detect
AWWU Outfall	Effluent	SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	ug/L	15	1	7%	0.38	13	6.3	6.3	6.3	N/A	The data set for variable	6.3	Max Detect
AWWU Outfall	Effluent	SVOCs/PAHs	Perylene	198-55-0	ug/L	9	8	89%	0.00063472	0.00063472	0.00314	0.0333	0.0158	0.021	95% KM (t) UCL	0.021	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Phenanthrene	85-01-8	ug/L	27	16	59%	0.26	140	0.204	0.98	0.373	0.416	95% KM (t) UCL	0.416	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Phenol	108-95-2	ug/L	18	16	89%	5.9	59	6	54.5	20.33	24.85	95% KM (t) UCL	24.85	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Pyrene	129-00-0	ug/L	27	12	44%	0.47	74	0.0913	0.47	0.175	0.22	95% KM (t) UCL	0.22	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Retene	483-65-8	ug/L	9	8	89%	0.00159	0.00159	0.0082	0.0108	0.0092	0.01	95% KM (t) UCL	0.01	95% KM (t) UCL
AWWU Outfall	Effluent	SVOCs/PAHs	Total PAHs	#N/A	ug/L	9	9	100%	--	--	4.204	8.178	5.779	6.682	95% Student's-t UCL	6.682	95% Student's-t UCL
AWWU Outfall	Effluent	Tetracycline antibiotic	Doxycycline	564-25-0	ug/L	1	1	100%	--	--	0.15	0.15	0.15	--	--	0.15	Mean
AWWU Outfall	Effluent	Tetracycline antibiotic	Tetracycline [TC]	60-54-8	ug/L	1	1	100%	--	--	0.0979	0.0979	0.0979	--	--	0.0979	Mean
AWWU Outfall	Effluent	Tranquilizer	Meprobamate	57-53-4	ug/L	2	2	100%	--	--	0.0168	0.383	0.2	--	--	0.2	Mean
AWWU Outfall	Effluent	Urinary steroid	Androsterone	53-41-8	ug/L	1	1	100%	--	--	0.0571	0.0571	0.0571	--	--	0.0571	Mean
AWWU Outfall	Effluent	VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	ug/L	18	1	6%	0.01	0.85	0.79	0.79	0.79	--	--	0.79	Max Detect
AWWU Outfall	Effluent	VOCs	1,2-Dichloroethane (EDC)	107-06-2	ug/L	18	1	6%	0.01	1.1	0.08	0.08	0.08	--	--	0.08	Max Detect
AWWU Outfall	Effluent	VOCs	1,4-Dichlorobenzene	106-46-7	ug/L	19	14	74%	0.16	4.7	0.27	0.84	0.554	0.615	95% KM (t) UCL	0.615	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	2-Butanone (MEK)	78-93-3	ug/L	14	14	100%	--	--	7	68	25.79	36.41	95% H-UCL	36.41	95% H-UCL
AWWU Outfall	Effluent	VOCs	2-Hexanone	591-78-6	ug/L	14	2	14%	0.01	2.5	3.3	5.7	4.5	1.746	95% KM (t) UCL	1.746	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	Acetone	67-64-1	ug/L	14	14	100%	--	--	130	300	194.3	219.8	95% Student's-t UCL	219.8	95% Student's-t UCL
AWWU Outfall	Effluent	VOCs	Acrolein	107-02-8	ug/L	18	2	11%	0.98	140	1	1.3	1.15	1.155	95% KM (t) UCL	1.155	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	Benzene	71-43-2	ug/L	25	20	80%	0.06	1.05	0.04	0.78	0.195	0.25	KM H-UCL	0.25	KM H-UCL
AWWU Outfall	Effluent	VOCs	Bromodichloromethane	75-27-4	ug/L	18	5	28%	0.01	1.1	0.04	0.08	0.06	0.0697	95% KM (t) UCL	0.0697	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	Bromomethane	74-83-9	ug/L	18	1	6%	0.01	1.15	0.09	0.09	0.09	N/A	The data set for variable	0.09	Max Detect
AWWU Outfall	Effluent	VOCs	Carbon Disulfide	75-15-0	ug/L	14	10	71%	0.032	0.2	0.29	0.7	0.597	0.574	95% KM (t) UCL	0.574	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	Chlorobenzene	108-90-7	ug/L	18	4	22%	0.01	0.8	0.03	0.08	0.05	0.0435	95% KM (t) UCL	0.0435	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	Chloroethane	75-00-3	ug/L	18	7	39%	0.054	2.6	0.17	0.69	0.401	0.329	95% KM (t) UCL	0.329	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	Chloroform	67-66-3	ug/L	18	18	100%	--	--	1.9	3.95	2.682	2.905	95% Student's-t UCL	2.905	95% Student's-t UCL
AWWU Outfall	Effluent	VOCs	Chloromethane	74-87-3	ug/L	18	14	78%	0.36	1.8	0.37	1.9	1.061	1.204	95% KM (t) UCL	1.204	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	cis-1,2-Dichloroethene	156-59-2	ug/L	18	6	33%	0.01	1.8	0.04	0.07	0.055	0.0435	95% KM (t) UCL	0.0435	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	Dichloromethane (Methylene Chloric	75-09-2	ug/L	18	16	89%	0.01	0.21	0.39	6.85	2.626	3.076	95% KM (t) UCL	3.076	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	Ethylbenzene	100-41-4	ug/L	25	23	92%	1.05	1.05	0.08	1.5	0.501	0.621	95% KM (t) UCL	0.621	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	m,p-Xylenes	179601-23-1	ug/L	25	22	88%	0.14	1.55	0.21	6.2	1.87	2.207	95% KM (t) UCL	2.207	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	o-Xylene	95-47-6	ug/L	25	23	92%	0.7	0.7	0.1	2.6	0.813	0.998	95% KM (t) UCL	0.998	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	Styrene	100-42-5	ug/L	14	9	64%	0.01	0.05	0.06	5.5	1.336	1.775	95% KM (t) UCL	1.775	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	Tetrachloroethene (PCE)	127-18-4	ug/L	18	13	72%	0.01	1.1	0.05	0.6	0.28	0.325	95% KM (t) UCL	0.325	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	Toluene	108-88-3	ug/L	25	25	100%	--	--	3.8	16	7.733	8.834	95% Student's-t UCL	8.834	95% Student's-t UCL
AWWU Outfall	Effluent	VOCs	Trichloroethene (TCE)	79-01-6	ug/L	18	2	11%	0.01	1.8	0.06	0.07	0.065	0.0446	95% KM (t) UCL	0.0446	95% KM (t) UCL
AWWU Outfall	Effluent	VOCs	Vinyl Chloride	75-01-4	ug/L	18	1	6%	0.01	1.8	0.02	0.02	0.02	N/A	The data set for variable Vinyl	0.02	Max Detect

Notes

[a] The 95% UCL as calculated has a limited sample size and the UCL was greater than the maximum detected concentration. The maximum detect was selected as the EPC.

RME-Reasonable Maximum Exposure

UCL - upper confidence limit

RME - reasonable maximum exposure

EPC - exposure point concentration

ug/L - microgram pre liter

Table C-4. Summary Statistics - Measured Fish Tissue

AWWU Ecological Risk Evaluation

Location	Matrix	Chemical Group	Analyte	CAS	Detected in Effluent?	Units	Number of Samples	Number of Detects	Percent Detection	Minimum Non-Detect	Maximum Non-Detect	Minimum Detect	Maximum Detect	Mean	95% UCL	95% UCL Basis	RME EPC	EPC Basis
Cook Inlet	Fish Tissue	Metals	Antimony	7440-36-0	Yes	mg/kg	16	9	56%	0.0099	0.014	0.003	0.01	0.00679	0.01	95%KM(t)UCL	0.008	95% KM (t) UCL
Cook Inlet	Fish Tissue	Metals	Arsenic	7440-38-2	Yes	mg/kg	16	16	100%	N/A	N/A	0.93	9.25	3.236	4.55	95%Student's-tUCL	4.546	95% Student's-t UCL
Cook Inlet	Fish Tissue	Metals	Beryllium	7440-41-7	Yes	mg/kg	16	6	38%	0.0037	0.0063	0.0009	0.01	0.00255	0.00	95%KM(t)UCL	0.003	95% KM (t) UCL
Cook Inlet	Fish Tissue	Metals	Cadmium	7440-43-9	Yes	mg/kg	16	16	100%	N/A	N/A	0.0184	0.75	0.0844	0.16	95%Student's-tUCL	0.162	95% Student's-t UCL
Cook Inlet	Fish Tissue	Metals	Chromium	7440-47-3	Yes	mg/kg	16	16	100%	N/A	N/A	0.025	0.88	0.312	0.42	95%Student's-tUCL	0.422	95% Student's-t UCL
Cook Inlet	Fish Tissue	Metals	Copper	7440-50-8	Yes	mg/kg	16	16	100%	N/A	N/A	0.899	19.70	2.474	4.50	95%Student's-tUCL	4.496	95% Student's-t UCL
Cook Inlet	Fish Tissue	Metals	Lead	7439-92-1	Yes	mg/kg	16	16	100%	N/A	N/A	0.0015	0.08	0.0229	0.03	95%Student's-tUCL	0.032	95% Student's-t UCL
Cook Inlet	Fish Tissue	Metals	Mercury	7439-97-6	Yes	mg/kg	16	16	100%	N/A	N/A	0.0028	0.05	0.0244	0.03	95%Student's-tUCL	0.032	95% Student's-t UCL
Cook Inlet	Fish Tissue	Metals	Methyl Mercury	22967-92-6	No	mg/kg	16	16	100%	N/A	N/A	0.0019	0.04	0.021	0.03	95%Student's-tUCL	0.028	95% Student's-t UCL
Cook Inlet	Fish Tissue	Metals	Molybdenum	7439-98-7	Yes	mg/kg	16	12	75%	0.02	0.024	0.007	0.05	0.0215	0.02	95%KM(t)UCL	0.024	95% KM (t) UCL
Cook Inlet	Fish Tissue	Metals	Nickel	7440-02-0	Yes	mg/kg	16	16	100%	N/A	N/A	0.018	0.58	0.209	0.27	95%Student's-tUCL	0.273	95% Student's-t UCL
Cook Inlet	Fish Tissue	Metals	Selenium	7782-49-2	Yes	mg/kg	16	16	100%	N/A	N/A	0.16	0.99	0.614	0.76	95%Student's-tUCL	0.757	95% Student's-t UCL
Cook Inlet	Fish Tissue	Metals	Silver	7440-22-4	Yes	mg/kg	16	16	100%	N/A	N/A	0.0026	0.25	0.0394	0.07	95%AdjustedGammaUCL	0.073	95% Adjusted Gamma UCL
Cook Inlet	Fish Tissue	Metals	Thallium	7440-28-0	Yes	mg/kg	16	13	81%	0.0042	0.0048	0.0006	0.00	0.0026	0.00	95%KM(t)UCL	0.004	95% KM (t) UCL
Cook Inlet	Fish Tissue	Metals	Zinc	7440-66-6	Yes	mg/kg	16	16	100%	N/A	N/A	10.8	50.90	24.34	31.55	95%Student's-tUCL	31.550	95% Student's-t UCL
Cook Inlet	Fish Tissue	PCBs	Aroclor 1254	11097-69-1	No	mg/kg	16	5	31%	0.0019	0.0043	0.0034	0.00	0.00414	0.00	95%KM(t)UCL	0.003	95% KM (t) UCL
Cook Inlet	Fish Tissue	PCBs	Aroclor 1260	11096-82-5	No	mg/kg	16	3	19%	0.0019	0.0028	0.0029	0.01	0.00427	0.00	95%KM(t)UCL	0.003	95% KM (t) UCL
Cook Inlet	Fish Tissue	Pesticides	Chlordane, alpha (cis)	5103-71-9	Yes	mg/kg	16	5	31%	0.001	0.001	0.0077	0.02	0.0101	0.01	95%KM(t)UCL	0.006	95% KM (t) UCL
Cook Inlet	Fish Tissue	Pesticides	Mirex	2385-85-5	No	mg/kg	16	1	6%	0.001	0.001	0.002	0.00	0.002	--	--	0.002	Max Detect
Cook Inlet	Fish Tissue	SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	Yes	mg/kg	16	2	13%	0.037	0.04	0.0092	0.03	0.0191	0.04	95%KM(t)UCL	0.029	Max Detect
Cook Inlet	Fish Tissue	SVOCs/PAHs	2-Nitrophenol	88-75-5	No	mg/kg	16	1	6%	0.037	0.04	0.098	0.10	0.098	--	--	0.098	Max Detect[a]
Cook Inlet	Fish Tissue	SVOCs/PAHs	4-Nitrophenol	100-02-7	No	mg/kg	16	3	19%	0.037	0.04	0.045	0.20	0.118	0.07	95%KM(t)UCL	0.075	95% KM (t) UCL
Cook Inlet	Fish Tissue	SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	Yes	mg/kg	16	5	31%	1.9	19	0.78	0.91	0.836	0.88	95%KM(t)UCL	0.875	95% KM (t) UCL
Cook Inlet	Fish Tissue	SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	Yes	mg/kg	16	3	19%	0.093	0.99	0.15	0.24	0.193	0.16	95%KM(t)UCL	0.164	95% KM (t) UCL
Cook Inlet	Fish Tissue	SVOCs/PAHs	Nitrobenzene	98-95-3	No	mg/kg	16	3	19%	0.037	0.04	0.0076	0.03	0.0179	0.03	95%KM(t)UCL	0.032	95% KM (t) UCL
Cook Inlet	Fish Tissue	SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	Yes	mg/kg	16	14	88%	0.0081	0.0081	0.017	0.32	0.071	0.10	95%KM(t)UCL	0.098	95% KM (t) UCL

Notes

[a] The 95% UCL as calculated has a limited sample size and the UCL was greater than the maximum detected concentration. The maximum detect was selected as the EPC.

EPC - exposure point concentration

mg/kg = milograms per kilograms

N/A = not applicable

RME-Reasonable Maximum Exposure

UCL - upper confidence limit

Table C-5. Prey Fish Exposure Scenarios
AWWU Ecological Risk Evaluation

Exposure	Exposure Areas	Dilution Factor[a]	Exposure Point Concentration	
			Preliminary Screening	Refined Assessment
Aquatic Organisms Exposed to Marine Surface Water	End of Pipe	1	Maximum Detect	RME EPC[b]
	Edge of ZID	109	Not evaluated in the Tier 1	
	Mid-Upper Cook Inlet	2,189		
	Knik Arm	1223		
	Turnagain Arm	9385		

Notes:

[a] Dilution factors determined by the Outfall Mixing Zone Study (Jacobs, 2024a)

[b] The Reasonable Maximum Exposure (RME) Exposure Point Concentration (EPC) was determined utilizing EPA PROUCL V5.2 (2022).

Table C-6. Marine Water Exposure Point Concentrations

AWWU Ecological Risk Evaluation

				Modeled based on Maximum Detected Concentrations[a]					Modeled Reasonable Maximum Concentrations[a]			
Chemical Group	Analyte	CAS	Maximum Measured Conc. End of Pipe (ug/L)	Maximum Modeled Conc. at Edge of ZID (DF=109) (ug/L)	Maximum Modeled Conc. at Knik Arm (DF=1223) (ug/L)	Maximum Modeled Conc. at Mid Upper Cook Inlet (DF=2189) (ug/L)	Maximum Modeled Conc. In Turnagain Arm (DF=9385) (ug/L)	RME EPC (ug/L)	Modeled EPC at Edge of ZID (DF=109) (ug/L)	Modeled EPC at Knik Arm (DF=1223) (ug/L)	Modeled EPC at Mid Upper Cook Inlet (DF=2189) (ug/L)	Modeled EPC In Turnagain Arm (DF=9385) (ug/L)
Metals	Antimony	7440-36-0	9.04E-01	8.29E-03	7.39E-04	4.13E-04	9.63E-05	6.78E-01	6.22E-03	5.54E-04	3.10E-04	7.22E-05
Metals	Arsenic	7440-38-2	3.42E+00	3.14E-02	2.80E-03	1.56E-03	3.64E-04	2.59E+00	2.37E-02	2.12E-03	1.18E-03	2.76E-04
Metals	Beryllium	7440-41-7	1.80E-02	1.65E-04	1.47E-05	8.22E-06	1.92E-06	6.96E-03	6.39E-05	5.69E-06	3.18E-06	7.42E-07
Metals	Cadmium	7440-43-9	3.09E-01	2.83E-03	2.53E-04	1.41E-04	3.29E-05	2.00E-01	1.83E-03	1.64E-04	9.14E-05	2.13E-05
Metals	Chromium	7440-47-3	3.46E+00	3.17E-02	2.83E-03	1.58E-03	3.69E-04	1.85E+00	1.70E-02	1.52E-03	8.47E-04	1.98E-04
Metals	Copper	7440-50-8	1.15E+02	1.06E+00	9.40E-02	5.25E-02	1.23E-02	4.03E+01	3.69E-01	3.29E-02	1.84E-02	4.29E-03
Metals	Dissolved Antimony	7440-36-0	8.06E-01	7.39E-03	6.59E-04	3.68E-04	8.59E-05	5.79E-01	5.31E-03	4.73E-04	2.65E-04	6.17E-05
Metals	Dissolved Arsenic	7440-38-2	2.78E+00	2.55E-02	2.27E-03	1.27E-03	2.96E-04	2.23E+00	2.04E-02	1.82E-03	1.02E-03	2.38E-04
Metals	Dissolved Beryllium	7440-41-7	4.00E-03	3.67E-05	3.27E-06	1.83E-06	4.26E-07	3.21E-03	2.94E-05	2.62E-06	1.47E-06	3.42E-07
Metals	Dissolved Cadmium	7440-43-9	2.10E-01	1.93E-03	1.72E-04	9.59E-05	2.24E-05	1.18E-01	1.08E-03	9.65E-05	5.39E-05	1.26E-05
Metals	Dissolved Chromium	7440-47-3	3.63E+00	3.33E-02	2.97E-03	1.66E-03	3.87E-04	1.18E+00	1.09E-02	9.68E-04	5.41E-04	1.26E-04
Metals	Dissolved Copper	7440-50-8	4.18E+01	3.83E-01	3.42E-02	1.91E-02	4.45E-03	2.20E+01	2.01E-01	1.79E-02	1.00E-02	2.34E-03
Metals	Dissolved Lead	7439-92-1	1.54E+00	1.41E-02	1.26E-03	7.04E-04	1.64E-04	7.86E-01	7.21E-03	6.43E-04	3.59E-04	8.38E-05
Metals	Dissolved Mercury	7439-97-6	8.94E-02	8.20E-04	7.31E-05	4.08E-05	9.53E-06	1.74E-02	1.60E-04	1.42E-05	7.95E-06	1.85E-06
Metals	Dissolved Molybdenum	7439-98-7	4.76E+01	4.37E-01	3.89E-02	2.17E-02	5.07E-03	4.24E+00	3.89E-02	3.46E-03	1.94E-03	4.51E-04
Metals	Dissolved Nickel	7440-02-0	9.49E+00	8.71E-02	7.76E-03	4.34E-03	1.01E-03	4.25E+00	3.90E-02	3.48E-03	1.94E-03	4.53E-04
Metals	Dissolved Selenium	7782-49-2	1.00E+00	9.17E-03	8.18E-04	4.57E-04	1.07E-04	6.85E-01	6.28E-03	5.60E-04	3.13E-04	7.30E-05
Metals	Dissolved Silver	7440-22-4	4.22E-01	3.87E-03	3.45E-04	1.93E-04	4.50E-05	1.28E-01	1.17E-03	1.05E-04	5.85E-05	1.36E-05
Metals	Dissolved Thallium	7440-28-0	3.20E-02	2.94E-04	2.62E-05	1.46E-05	3.41E-06	4.85E-03	4.45E-05	3.97E-06	2.22E-06	5.17E-07
Metals	Dissolved Zinc	7440-66-6	1.24E+02	1.14E+00	1.01E-01	5.66E-02	1.32E-02	6.96E+01	6.39E-01	5.69E-02	3.18E-02	7.42E-03
Metals	Lead	7439-92-1	4.80E+00	4.40E-02	3.92E-03	2.19E-03	5.11E-04	1.94E+00	1.78E-02	1.59E-03	8.87E-04	2.07E-04
Metals	Mercury	7439-97-6	1.14E-01	1.05E-03	9.32E-05	5.21E-05	1.21E-05	3.16E-02	2.90E-04	2.58E-05	1.44E-05	3.37E-06
Metals	Molybdenum	7439-98-7	4.87E+01	4.47E-01	3.98E-02	2.22E-02	5.19E-03	4.52E+00	4.15E-02	3.70E-03	2.07E-03	4.82E-04
Metals	Nickel	7440-02-0	6.70E+00	6.15E-02	5.48E-03	3.06E-03	7.14E-04	4.60E+00	4.22E-02	3.76E-03	2.10E-03	4.90E-04
Metals	Selenium	7782-49-2	1.20E+00	1.10E-02	9.81E-04	5.48E-04	1.28E-04	8.48E-01	7.78E-03	6.93E-04	3.87E-04	9.04E-05
Metals	Silver	7440-22-4	4.90E-01	4.50E-03	4.01E-04	2.24E-04	5.22E-05	2.54E-01	2.33E-03	2.08E-04	1.16E-04	2.71E-05
Metals	Thallium	7440-28-0	5.20E-02	4.77E-04	4.25E-05	2.38E-05	5.54E-06	8.12E-03	7.45E-05	6.64E-06	3.71E-06	8.65E-07
Metals	Zinc	7440-66-6	1.65E+02	1.51E+00	1.35E-01	7.54E-02	1.76E-02	1.08E+02	9.92E-01	8.84E-02	4.94E-02	1.15E-02
Ammonia	Total Ammonia	7664-41-7	3.30E+04	3.03E+02	2.70E+01	1.51E+01	3.52E+00	2.67E+04	2.45E+02	2.18E+01	1.22E+01	2.84E+00
Cyanide	Cyanide, Total	57-12-5	9.00E+00	8.26E-02	7.36E-03	4.11E-03	9.59E-04	1.34E+00	1.23E-02	1.09E-03	6.11E-04	1.43E-04
ACE inhibitor	Enalapril	75847-73-3	1.21E-02	1.11E-04	9.89E-06	5.53E-06	1.29E-06	9.03E-03	8.28E-05	7.38E-06	4.13E-06	9.62E-07
Anabolic agent	Androstenedione	63-05-8	1.62E-01	1.49E-03	1.32E-04	7.40E-05	1.73E-05	1.62E-01	1.49E-03	1.32E-04	7.40E-05	1.73E-05
Analgesic	Ibuprofen	15687-27-1	2.09E+01	1.92E-01	1.71E-02	9.55E-03	2.23E-03	1.45E+01	1.33E-01	1.19E-02	6.64E-03	1.55E-03
Analgesic (Ibuprofen meta	2-Hydroxy-ibuprofen	51146-55-5	3.87E+01	3.55E-01	3.16E-02	1.77E-02	4.12E-03	3.87E+01	3.55E-01	3.16E-02	1.77E-02	4.12E-03
Anti-acid reflux	Ranitidine	66357-35-5	8.44E-02	7.74E-04	6.90E-05	3.86E-05	8.99E-06	8.44E-02	7.74E-04	6.90E-05	3.86E-05	8.99E-06
Antiasthmatic	Albuterol	18559-94-9	2.01E-02	1.84E-04	1.64E-05	9.18E-06	2.14E-06	1.73E-02	1.59E-04	1.41E-05	7.90E-06	1.84E-06
Antiasthmatic	Theophylline	58-55-9	5.11E+01	4.69E-01	4.18E-02	2.33E-02	5.44E-03	4.98E+01	4.56E-01	4.07E-02	2.27E-02	5.30E-03
Antibacterial	Penicillin V	87-08-1	1.34E-02	1.23E-04	1.10E-05	6.12E-06	1.43E-06	1.34E-02	1.23E-04	1.10E-05	6.12E-06	1.43E-06
Antibiotic	4-Epitetracycline [ETC]	23313-80-6	6.62E-02	6.07E-04	5.41E-05	3.02E-05	7.05E-06	6.62E-02	6.07E-04	5.41E-05	3.02E-05	7.05E-06
Antibiotic	Enrofloxacin	93106-60-6	7.08E-04	6.50E-06	5.79E-07	3.23E-07	7.54E-08	7.08E-04	6.50E-06	5.79E-07	3.23E-07	7.54E-08
Anticonvulsant	Benztropine	86-13-5	1.05E-03	9.63E-06	8.59E-07	4.80E-07	1.12E-07	1.05E-03	9.63E-06	8.59E-07	4.80E-07	1.12E-07
Anticonvulsant	Carbamazepine	298-46-4	5.06E-01	4.64E-03	4.14E-04	2.31E-04	5.39E-05	3.09E-01	2.83E-03	2.53E-04	1.41E-04	3.29E-05
Antidepressant	10-hydroxy-amitriptyline	1159-82-6	1.92E-02	1.76E-04	1.57E-05	8.77E-06	2.05E-06	1.53E-02	1.40E-04	1.25E-05	6.99E-06	1.63E-06
Antidepressant	Amitriptyline	50-48-6	7.46E-02	6.84E-04	6.10E-05	3.41E-05	7.95E-06	5.20E-02	4.77E-04	4.25E-05	2.38E-05	5.54E-06
Antidiabetic drug	Glipizide	29094-61-9	1.07E-02	9.82E-05	8.75E-06	4.89E-06	1.14E-06	7.64E-03	7.01E-05	6.25E-06	3.49E-06	8.14E-07
Antidiabetic drug	Glyburide	10238-21-8	1.85E-02	1.70E-04	1.51E-05	8.45E-06	1.97E-06	1.85E-02	1.70E-04	1.51E-05	8.45E-06	1.97E-06
Antidiabetic drug	Metformin	657-24-9	8.93E+01	8.19E-01	7.30E-02	4.08E-02	9.52E-03	6.76E+01	6.20E-01	5.53E-02	3.09E-02	7.20E-03
Antifungal agent	Miconazole	22916-47-8	5.62E-02	5.16E-04	4.60E-05	2.57E-05	5.99E-06	2.91E-02	2.67E-04	2.38E-05	1.33E-05	3.10E-06
Antihistamine	Diphenhydramine	58-73-1	1.68E+00	1.54E-02	1.37E-03	7.67E-04	1.79E-04	1.14E+00	1.04E-02	9.30E-04	5.19E-04	1.21E-04
Antihistamine	Promethazine	60-87-7	3.35E-02	3.07E-04	2.74E-05	1.53E-05	3.57E-06	3.35E-02	3.07E-04	2.74E-05	1.53E-05	3.57E-06
Antihypertensive	Diltiazem	42399-41-7	4.06E-01	3.72E-03	3.32E-04	1.85E-04	4.33E-05	2.51E-01	2.30E-03	2.05E-04	1.15E-04	2.67E-05
Antihypertensive	Valsartan	137862-53-4	1.58E+01	1.45E-01	1.29E-02	7.22E-03	1.68E-03	9.14E+00	8.39E-02	7.47E-03	4.18E-03	9.74E-04

Table C-6. Marine Water Exposure Point Concentrations

AWWU Ecological Risk Evaluation

Chemical Group	Analyte	CAS	Maximum Measured Conc. End of Pipe (ug/L)	Modeled based on Maximum Detected Concentrations[a]				RME EPC (ug/L)	Modeled Reasonable Maximum Concentrations[a]			
				Maximum Modeled Conc. at Edge of ZID (DF=109) (ug/L)	Maximum Modeled Conc. at Knik Arm (DF=1223) (ug/L)	Maximum Modeled Conc. at Mid Upper Cook Inlet (DF=2189) (ug/L)	Maximum Modeled Conc. In Turnagain Arm (DF=9385) (ug/L)		Modeled EPC at Edge of ZID (DF=109) (ug/L)	Modeled EPC at Knik Arm (DF=1223) (ug/L)	Modeled EPC at Mid Upper Cook Inlet (DF=2189) (ug/L)	Modeled EPC In Turnagain Arm (DF=9385) (ug/L)
Antihypertensive	Verapamil	52-53-9	5.12E-02	4.70E-04	4.19E-05	2.34E-05	5.46E-06	3.08E-02	2.83E-04	2.52E-05	1.41E-05	3.28E-06
Antilipemic	Gemfibrozil	25812-30-0	1.33E+00	1.22E-02	1.09E-03	6.08E-04	1.42E-04	7.57E-01	6.94E-03	6.19E-04	3.46E-04	8.07E-05
Antimicrobial, disinfectant	Triclocarban	101-20-2	4.89E-03	4.49E-05	4.00E-06	2.23E-06	5.21E-07	4.89E-03	4.49E-05	4.00E-06	2.23E-06	5.21E-07
Antimicrobial, disinfectant	Triclosan	3380-34-5	4.31E+00	3.95E-02	3.52E-03	1.97E-03	4.59E-04	4.31E+00	3.95E-02	3.52E-03	1.97E-03	4.59E-04
Antipyretic, analgesic	Acetaminophen	103-90-2	1.22E+02	1.12E+00	9.98E-02	5.57E-02	1.30E-02	9.48E+01	8.69E-01	7.75E-02	4.33E-02	1.01E-02
Antispasmodic, caffeine me	1,7-Dimethylxanthine	611-59-6	5.78E+01	5.30E-01	4.73E-02	2.64E-02	6.16E-03	3.70E+01	3.39E-01	3.03E-02	1.69E-02	3.94E-03
Betablocker	Atenolol	29122-68-7	1.88E+00	1.72E-02	1.54E-03	8.59E-04	2.00E-04	1.13E+00	1.04E-02	9.25E-04	5.17E-04	1.21E-04
Betablocker	Metoprolol	51384-51-1	4.89E-01	4.49E-03	4.00E-04	2.23E-04	5.21E-05	4.75E-01	4.36E-03	3.88E-04	2.17E-04	5.06E-05
Betablocker	Propranolol	525-66-6	7.48E-02	6.86E-04	6.12E-05	3.42E-05	7.97E-06	6.80E-02	6.24E-04	5.56E-05	3.11E-05	7.25E-06
BloodThinner	Warfarin	81-81-2	4.03E-03	3.70E-05	3.30E-06	1.84E-06	4.29E-07	4.03E-03	3.70E-05	3.30E-06	1.84E-06	4.29E-07
ChannelBlocker	Amlodipine	88150-42-9	2.48E-02	2.28E-04	2.03E-05	1.13E-05	2.64E-06	2.18E-02	2.00E-04	1.78E-05	9.96E-06	2.32E-06
ChannelBlocker	Dehydronifedipine	67035-22-7	1.40E-03	1.28E-05	1.14E-06	6.40E-07	1.49E-07	1.40E-03	1.28E-05	1.14E-06	6.40E-07	1.49E-07
ChannelBlocker	Desmethyldiltiazem	42399-41-7	8.36E-02	7.67E-04	6.84E-05	3.82E-05	8.91E-06	5.69E-02	5.22E-04	4.65E-05	2.60E-05	6.06E-06
ChannelBlocker	Norverapamil	67018-85-3	1.89E-02	1.73E-04	1.55E-05	8.63E-06	2.01E-06	1.24E-02	1.14E-04	1.01E-05	5.66E-06	1.32E-06
Cocaine metabolite	Benzoylecgonine	519-09-5	1.96E+00	1.80E-02	1.60E-03	8.95E-04	2.09E-04	1.94E+00	1.78E-02	1.59E-03	8.86E-04	2.07E-04
Contraceptive	Norgestrel	6533-00-2	8.18E-02	7.50E-04	6.69E-05	3.74E-05	8.72E-06	8.18E-02	7.50E-04	6.69E-05	3.74E-05	8.72E-06
Corticosteroid	Hydrocortisone	50-23-7	7.82E-01	7.17E-03	6.39E-04	3.57E-04	8.33E-05	4.95E-01	4.54E-03	4.05E-04	2.26E-04	5.27E-05
Depressant	Alprazolam	28981-97-7	3.23E-03	2.96E-05	2.64E-06	1.48E-06	3.44E-07	2.05E-03	1.88E-05	1.68E-06	9.37E-07	2.18E-07
Depressant	Diazepam	439-14-5	8.27E-04	7.59E-06	6.76E-07	3.78E-07	8.81E-08	8.27E-04	7.59E-06	6.76E-07	3.78E-07	8.81E-08
Diuretic	Furosemide	54-31-9	2.08E-01	1.91E-03	1.70E-04	9.50E-05	2.22E-05	2.05E-01	1.88E-03	1.68E-04	9.37E-05	2.18E-05
Diuretic	Hydrochlorothiazide	58-93-5	1.07E+00	9.82E-03	8.75E-04	4.89E-04	1.14E-04	7.13E-01	6.54E-03	5.83E-04	3.26E-04	7.60E-05
Diuretic	Triamterene	396-01-0	9.41E-02	8.63E-04	7.69E-05	4.30E-05	1.00E-05	6.45E-02	5.92E-04	5.27E-05	2.95E-05	6.87E-06
Fungicide and parasiticide	Thiabendazole	148-79-8	3.06E-02	2.81E-04	2.50E-05	1.40E-05	3.26E-06	2.73E-02	2.50E-04	2.23E-05	1.25E-05	2.91E-06
Glycoside	Digoxin	20830-75-5	7.01E-02	6.43E-04	5.73E-05	3.20E-05	7.47E-06	7.01E-02	6.43E-04	5.73E-05	3.20E-05	7.47E-06
Lincosamide antibiotic	Lincomycin	154-21-2	4.35E-02	3.99E-04	3.56E-05	1.99E-05	4.64E-06	2.39E-02	2.19E-04	1.95E-05	1.09E-05	2.55E-06
Macrolide antibiotic	Azithromycin	83905-01-5	3.41E-01	3.13E-03	2.79E-04	1.56E-04	3.63E-05	2.27E-01	2.08E-03	1.86E-04	1.04E-04	2.42E-05
Macrolide antibiotic	Clarithromycin	81103-11-9	1.65E-01	1.51E-03	1.35E-04	7.54E-05	1.76E-05	1.03E-01	9.45E-04	8.42E-05	4.71E-05	1.10E-05
Macrolide antibiotic	Erythromycin-H2O	114-07-8	1.68E-01	1.54E-03	1.37E-04	7.67E-05	1.79E-05	9.00E-02	8.26E-04	7.36E-05	4.11E-05	9.59E-06
Macrolide antibiotic	Roxithromycin	80214-83-1	9.41E-04	8.63E-06	7.69E-07	4.30E-07	1.00E-07	9.41E-04	8.63E-06	7.69E-07	4.30E-07	1.00E-07
Macrolide antibiotic	Tylosin	1401-69-0	1.43E-03	1.31E-05	1.17E-06	6.53E-07	1.52E-07	1.43E-03	1.31E-05	1.17E-06	6.53E-07	1.52E-07
Nicotinemetabolite	Cotinine	486-56-6	2.80E+00	2.57E-02	2.29E-03	1.28E-03	2.98E-04	2.45E+00	2.25E-02	2.00E-03	1.12E-03	2.61E-04
Non-steroidalanti-inflamm	Naproxen	22204-53-1	1.24E+01	1.14E-01	1.01E-02	5.66E-03	1.32E-03	9.33E+00	8.56E-02	7.62E-03	4.26E-03	9.94E-04
Oil & Grease	Oil and Grease, Total (HEM)	--	4.27E+04	3.92E+02	3.49E+01	1.95E+01	4.55E+00	3.20E+04	2.94E+02	2.62E+01	1.46E+01	3.41E+00
Opiate	Codeine	76-57-3	1.52E-01	1.39E-03	1.24E-04	6.94E-05	1.62E-05	1.05E-01	9.63E-04	8.59E-05	4.80E-05	1.12E-05
Opiate	Hydrocodone	125-29-1	6.87E-02	6.30E-04	5.62E-05	3.14E-05	7.32E-06	4.73E-02	4.34E-04	3.87E-05	2.16E-05	5.04E-06
Opiate	Oxycodone	76-42-6	1.60E-01	1.47E-03	1.31E-04	7.31E-05	1.70E-05	1.08E-01	9.91E-04	8.83E-05	4.93E-05	1.15E-05
Opiod	Propoxyphene	469-62-5	1.02E-02	9.36E-05	8.34E-06	4.66E-06	1.09E-06	1.02E-02	9.36E-05	8.34E-06	4.66E-06	1.09E-06
PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BD	1163-19-5	2.58E-02	2.37E-04	2.11E-05	1.18E-05	2.75E-06	2.58E-02	2.37E-04	2.11E-05	1.18E-05	2.75E-06
PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	32534-81-9	5.24E-03	4.81E-05	4.28E-06	2.39E-06	5.58E-07	5.24E-03	4.81E-05	4.28E-06	2.39E-06	5.58E-07
PBDEs	2,2',3,4,4',5,5',6-OcBDE	337513-72-1	1.41E-03	1.29E-05	1.15E-06	6.44E-07	1.50E-07	1.41E-03	1.29E-05	1.15E-06	6.44E-07	1.50E-07
PBDEs	2,2',3,4,4',5',6-HpBDE	207122-16-5	6.87E-04	6.30E-06	5.62E-07	3.14E-07	7.32E-08	6.87E-04	6.30E-06	5.62E-07	3.14E-07	7.32E-08
PBDEs	2,2',3,4,4',5'-HxBDE	182677-30-1	4.94E-04	4.53E-06	4.04E-07	2.26E-07	5.26E-08	4.94E-04	4.53E-06	4.04E-07	2.26E-07	5.26E-08
PBDEs	2,2',3,4,4',6'-HxBDE	243982-83-4	1.54E-04	1.41E-06	1.26E-07	7.04E-08	1.64E-08	1.54E-04	1.41E-06	1.26E-07	7.04E-08	1.64E-08
PBDEs	2,2',3,4,4'-PeBDE	182346-21-0	1.82E-03	1.67E-05	1.49E-06	8.31E-07	1.94E-07	1.82E-03	1.67E-05	1.49E-06	8.31E-07	1.94E-07
PBDEs	2,2',4,4',5,5'-HxBDE	68631-49-2	3.60E-03	3.30E-05	2.94E-06	1.64E-06	3.84E-07	3.60E-03	3.30E-05	2.94E-06	1.64E-06	3.84E-07
PBDEs	2,2',4,4',5,6'-HxBDE	207122-15-4	3.05E-03	2.80E-05	2.49E-06	1.39E-06	3.25E-07	3.05E-03	2.80E-05	2.49E-06	1.39E-06	3.25E-07
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	60348-60-9	4.06E-02	3.72E-04	3.32E-05	1.85E-05	4.33E-06	4.06E-02	3.72E-04	3.32E-05	1.85E-05	4.33E-06
PBDEs	2,2',4,4',6,6'-HxBDE	35854-94-5	2.13E-04	1.95E-06	1.74E-07	9.73E-08	2.27E-08	2.13E-04	1.95E-06	1.74E-07	9.73E-08	2.27E-08
PBDEs	2,2',4,4',6-PeBDE	189084-64-8	8.11E-03	7.44E-05	6.63E-06	3.70E-06	8.64E-07	8.11E-03	7.44E-05	6.63E-06	3.70E-06	8.64E-07
PBDEs	2,2',4,4'-TeBDE (BDE-47)	5436-43-1	4.32E-02	3.96E-04	3.53E-05	1.97E-05	4.60E-06	4.32E-02	3.96E-04	3.53E-05	1.97E-05	4.60E-06
PBDEs	2,2',4,5'-TeBDE	243982-82-3	1.56E-03	1.43E-05	1.28E-06	7.13E-07	1.66E-07	1.56E-03	1.43E-05	1.28E-06	7.13E-07	1.66E-07
PBDEs	2,2',4,6'-TeBDE	189084-57-9	2.40E-04	2.20E-06	1.96E-07	1.10E-07	2.56E-08	2.40E-04	2.20E-06	1.96E-07	1.10E-07	2.56E-08

Table C-6. Marine Water Exposure Point Concentrations

AWWU Ecological Risk Evaluation

				Modeled based on Maximum Detected Concentrations[a]					Modeled Reasonable Maximum Concentrations[a]			
Chemical Group	Analyte	CAS	Maximum Measured Conc. End of Pipe (ug/L)	Maximum Modeled Conc. at Edge of ZID (DF=109) (ug/L)	Maximum Modeled Conc. at Knik Arm (DF=1223) (ug/L)	Maximum Modeled Conc. at Mid Upper Cook Inlet (DF=2189) (ug/L)	Maximum Modeled Conc. In Turnagain Arm (DF=9385) (ug/L)	RME EPC (ug/L)	Modeled EPC at Edge of ZID (DF=109) (ug/L)	Modeled EPC at Knik Arm (DF=1223) (ug/L)	Modeled EPC at Mid Upper Cook Inlet (DF=2189) (ug/L)	Modeled EPC In Turnagain Arm (DF=9385) (ug/L)
PBDEs	2,2',4-TriBDE	147217-75-2	1.11E-03	1.02E-05	9.08E-07	5.07E-07	1.18E-07	1.11E-03	1.02E-05	9.08E-07	5.07E-07	1.18E-07
PBDEs	2,3',4,4',6-PeBDE	189084-66-0	2.02E-04	1.85E-06	1.65E-07	9.23E-08	2.15E-08	2.02E-04	1.85E-06	1.65E-07	9.23E-08	2.15E-08
PBDEs	2,3',4,4'-TeBDE	189084-61-5	1.50E-03	1.38E-05	1.23E-06	6.85E-07	1.60E-07	1.50E-03	1.38E-05	1.23E-06	6.85E-07	1.60E-07
PBDEs	2,3',4,4',6-TeBDE	189084-62-6	5.58E-04	5.12E-06	4.56E-07	2.55E-07	5.95E-08	5.58E-04	5.12E-06	4.56E-07	2.55E-07	5.95E-08
PBDEs	2,4,4'-TriBDE	41318-75-6	1.35E-03	1.24E-05	1.10E-06	6.17E-07	1.44E-07	1.35E-03	1.24E-05	1.10E-06	6.17E-07	1.44E-07
Pesticides	2,4'-DDD	53-19-0	1.07E-03	9.82E-06	8.75E-07	4.89E-07	1.14E-07	1.07E-03	9.82E-06	8.75E-07	4.89E-07	1.14E-07
Pesticides	4,4'-DDD	72-54-8	2.10E-02	1.93E-04	1.72E-05	9.59E-06	2.24E-06	7.62E-03	6.99E-05	6.23E-06	3.48E-06	8.12E-07
Pesticides	4,4'-DDE	72-55-9	4.70E-03	4.31E-05	3.84E-06	2.15E-06	5.01E-07	3.38E-03	3.10E-05	2.76E-06	1.54E-06	3.60E-07
Pesticides	4,4'-DDT	50-29-3	1.86E-04	1.71E-06	1.52E-07	8.50E-08	1.98E-08	1.86E-04	1.71E-06	1.52E-07	8.50E-08	1.98E-08
Pesticides	Aldrin	309-00-2	9.70E-03	8.90E-05	7.93E-06	4.43E-06	1.03E-06	3.95E-03	3.62E-05	3.23E-06	1.80E-06	4.21E-07
Pesticides	Chlordane, alpha (cis)	5103-71-9	1.42E-04	1.30E-06	1.16E-07	6.49E-08	1.51E-08	1.42E-04	1.30E-06	1.16E-07	6.49E-08	1.51E-08
Pesticides	Chlorpyriphos	2921-88-2	9.72E-04	8.92E-06	7.95E-07	4.44E-07	1.04E-07	9.72E-04	8.92E-06	7.95E-07	4.44E-07	1.04E-07
Pesticides	Chlorpyriphos-Methyl	5598-13-0	2.11E-04	1.94E-06	1.73E-07	9.64E-08	2.25E-08	2.11E-04	1.94E-06	1.73E-07	9.64E-08	2.25E-08
Pesticides	Cypermethrin	52315-07-8	4.05E-03	3.72E-05	3.31E-06	1.85E-06	4.32E-07	4.05E-03	3.72E-05	3.31E-06	1.85E-06	4.32E-07
Pesticides	DEET	134-62-3	6.36E+00	5.83E-02	5.20E-03	2.91E-03	6.78E-04	5.01E+00	4.59E-02	4.09E-03	2.29E-03	5.33E-04
Pesticides	Demeton-O,S	126-75-0	3.80E-02	3.49E-04	3.11E-05	1.74E-05	4.05E-06	3.80E-02	3.49E-04	3.11E-05	1.74E-05	4.05E-06
Pesticides	Dieldrin	60-57-1	1.40E-02	1.28E-04	1.14E-05	6.40E-06	1.49E-06	5.22E-03	4.79E-05	4.27E-06	2.38E-06	5.56E-07
Pesticides	Endosulfan Sulfate	1031-07-8	2.20E-02	2.02E-04	1.80E-05	1.01E-05	2.34E-06	2.20E-02	2.02E-04	1.80E-05	1.01E-05	2.34E-06
Pesticides	Endrin	72-20-8	6.20E-05	5.69E-07	5.07E-08	2.83E-08	6.61E-09	6.20E-05	5.69E-07	5.07E-08	2.83E-08	6.61E-09
Pesticides	Endrin Ketone	53494-70-5	9.60E-03	8.81E-05	7.85E-06	4.39E-06	1.02E-06	9.60E-03	8.81E-05	7.85E-06	4.39E-06	1.02E-06
Pesticides	HCH, alpha	319-84-6	6.60E-05	6.06E-07	5.40E-08	3.02E-08	7.03E-09	6.60E-05	6.06E-07	5.40E-08	3.02E-08	7.03E-09
Pesticides	HCH, beta	319-85-7	1.09E-04	1.00E-06	8.91E-08	4.98E-08	1.16E-08	1.09E-04	1.00E-06	8.91E-08	4.98E-08	1.16E-08
Pesticides	HCH, gamma	58-89-9	6.96E-04	6.39E-06	5.69E-07	3.18E-07	7.42E-08	6.96E-04	6.39E-06	5.69E-07	3.18E-07	7.42E-08
Pesticides	Heptachlor	76-44-8	1.40E-02	1.28E-04	1.14E-05	6.40E-06	1.49E-06	1.40E-02	1.28E-04	1.14E-05	6.40E-06	1.49E-06
Pesticides	Hexachlorobenzene	118-74-1	5.17E-04	4.74E-06	4.23E-07	2.36E-07	5.51E-08	5.17E-04	4.74E-06	4.23E-07	2.36E-07	5.51E-08
Pesticides	Malathion	121-75-5	5.20E-01	4.77E-03	4.25E-04	2.38E-04	5.54E-05	1.01E-01	9.27E-04	8.26E-05	4.61E-05	1.08E-05
Pesticides	Methoxychlor	72-43-5	2.90E-03	2.66E-05	2.37E-06	1.32E-06	3.09E-07	2.90E-03	2.66E-05	2.37E-06	1.32E-06	3.09E-07
Pesticides	Permethrin	52645-53-1	4.23E-02	3.88E-04	3.46E-05	1.93E-05	4.51E-06	4.23E-02	3.88E-04	3.46E-05	1.93E-05	4.51E-06
PFAS	5:3 FTCA	1799325-94-2	5.92E-02	5.43E-04	4.84E-05	2.70E-05	6.31E-06	5.92E-02	5.43E-04	4.84E-05	2.70E-05	6.31E-06
PFAS	PFBA	375-22-4	1.49E-02	1.37E-04	1.22E-05	6.81E-06	1.59E-06	9.97E-03	9.15E-05	8.15E-06	4.55E-06	1.06E-06
PFAS	PFHpA	375-85-9	8.47E-03	7.77E-05	6.93E-06	3.87E-06	9.03E-07	7.84E-03	7.19E-05	6.41E-06	3.58E-06	8.35E-07
PFAS	PFHxA	307-24-4	2.55E-02	2.34E-04	2.09E-05	1.16E-05	2.72E-06	2.42E-02	2.22E-04	1.98E-05	1.11E-05	2.58E-06
PFAS	PFHxS	355-46-4	3.96E-02	3.63E-04	3.24E-05	1.81E-05	4.22E-06	3.26E-02	2.99E-04	2.67E-05	1.49E-05	3.47E-06
PFAS	PFNA	375-95-1	5.14E-03	4.72E-05	4.20E-06	2.35E-06	5.48E-07	3.91E-03	3.59E-05	3.20E-06	1.79E-06	4.17E-07
PFAS	PFOA	335-67-1	1.85E-02	1.70E-04	1.51E-05	8.45E-06	1.97E-06	1.79E-02	1.64E-04	1.46E-05	8.18E-06	1.91E-06
PFAS	PFOS	1763-23-1	6.53E-02	5.99E-04	5.34E-05	2.98E-05	6.96E-06	4.47E-02	4.10E-04	3.65E-05	2.04E-05	4.76E-06
PFAS	PFPeA	2706-90-3	2.03E-02	1.86E-04	1.66E-05	9.27E-06	2.16E-06	1.45E-02	1.33E-04	1.19E-05	6.62E-06	1.55E-06
PFAS	PFPeS	175905-36-9	3.84E-03	3.52E-05	3.14E-06	1.75E-06	4.09E-07	3.84E-03	3.52E-05	3.14E-06	1.75E-06	4.09E-07
Plasticizer	Bisphenol A	80-05-7	1.59E+00	1.46E-02	1.30E-03	7.26E-04	1.69E-04	1.59E+00	1.46E-02	1.30E-03	7.26E-04	1.69E-04
Plasticizer	Bisphenol S	80-09-1	8.88E-01	8.15E-03	7.26E-04	4.06E-04	9.46E-05	8.88E-01	8.15E-03	7.26E-04	4.06E-04	9.46E-05
Pyrimidine antibiotic	Trimethoprim	738-70-5	7.11E-01	6.52E-03	5.81E-04	3.25E-04	7.58E-05	5.03E-01	4.61E-03	4.11E-04	2.30E-04	5.36E-05
Quinoline antibiotic	Ciprofloxacin	85721-33-1	3.72E-01	3.41E-03	3.04E-04	1.70E-04	3.96E-05	2.37E-01	2.17E-03	1.94E-04	1.08E-04	2.53E-05
Quinoline antibiotic	Ofloxacin	82419-36-1	4.27E-01	3.92E-03	3.49E-04	1.95E-04	4.55E-05	2.57E-01	2.36E-03	2.10E-04	1.17E-04	2.74E-05
Rubber Stabilizing compou	6PPD-Quinone	2754428-18-5	5.30E-03	4.86E-05	4.33E-06	2.42E-06	5.65E-07	5.30E-03	4.86E-05	4.33E-06	2.42E-06	5.65E-07
Sex hormone	17 beta-Estradiol	50-28-2	5.52E-03	5.06E-05	4.51E-06	2.52E-06	5.88E-07	5.52E-03	5.06E-05	4.51E-06	2.52E-06	5.88E-07
Sex hormone	Estrone	53-16-7	3.31E-02	3.04E-04	2.71E-05	1.51E-05	3.53E-06	3.31E-02	3.04E-04	2.71E-05	1.51E-05	3.53E-06
Sex hormone	Progesterone	57-83-0	5.66E-02	5.19E-04	4.63E-05	2.59E-05	6.03E-06	5.66E-02	5.19E-04	4.63E-05	2.59E-05	6.03E-06
Sex hormone	Testosterone	58-22-0	7.17E-02	6.58E-04	5.86E-05	3.28E-05	7.64E-06	7.17E-02	6.58E-04	5.86E-05	3.28E-05	7.64E-06
SSRI Antidepressant	Fluoxetine	54910-89-3	5.20E-02	4.77E-04	4.25E-05	2.38E-05	5.54E-06	4.03E-02	3.70E-04	3.30E-05	1.84E-05	4.29E-06
SSRI Antidepressant	Norfluoxetine	83891-03-6	2.73E-02	2.50E-04	2.23E-05	1.25E-05	2.91E-06	1.76E-02	1.61E-04	1.44E-05	8.04E-06	1.88E-06
SSRI Antidepressant	Paroxetine	61869-08-7	1.88E-02	1.72E-04	1.54E-05	8.59E-06	2.00E-06	1.12E-02	1.03E-04	9.16E-06	5.12E-06	1.19E-06
SSRI Antidepressant	Sertraline	79617-96-2	1.08E-01	9.91E-04	8.83E-05	4.93E-05	1.15E-05	7.82E-02	7.17E-04	6.39E-05	3.57E-05	8.33E-06

Table C-6. Marine Water Exposure Point Concentrations

AWWU Ecological Risk Evaluation

				Modeled based on Maximum Detected Concentrations[a]					Modeled Reasonable Maximum Concentrations[a]			
Chemical Group	Analyte	CAS	Maximum Measured Conc. End of Pipe (ug/L)	Maximum Modeled Conc. at Edge of ZID (DF=109) (ug/L)	Maximum Modeled Conc. at Knik Arm (DF=1223) (ug/L)	Maximum Modeled Conc. at Mid Upper Cook Inlet (DF=2189) (ug/L)	Maximum Modeled Conc. In Turnagain Arm (DF=9385) (ug/L)	RME EPC (ug/L)	Modeled EPC at Edge of ZID (DF=109) (ug/L)	Modeled EPC at Knik Arm (DF=1223) (ug/L)	Modeled EPC at Mid Upper Cook Inlet (DF=2189) (ug/L)	Modeled EPC In Turnagain Arm (DF=9385) (ug/L)
Statin	Atorvastatin	134523-00-5	2.20E-01	2.02E-03	1.80E-04	1.01E-04	2.34E-05	1.40E-01	1.28E-03	1.14E-04	6.40E-05	1.49E-05
Steroid	Methylprednisolone	83-43-2	1.13E-01	1.04E-03	9.24E-05	5.16E-05	1.20E-05	1.13E-01	1.04E-03	9.24E-05	5.16E-05	1.20E-05
Steroid	Prednisolone	50-24-8	9.31E-03	8.54E-05	7.61E-06	4.25E-06	9.92E-07	9.31E-03	8.54E-05	7.61E-06	4.25E-06	9.92E-07
Steroidal Estrogen	Equilenin	517-09-9	1.34E-02	1.23E-04	1.10E-05	6.12E-06	1.43E-06	1.34E-02	1.23E-04	1.10E-05	6.12E-06	1.43E-06
Stimulant	Amphetamine	300-62-9	5.39E-01	4.94E-03	4.41E-04	2.46E-04	5.74E-05	4.22E-01	3.87E-03	3.45E-04	1.93E-04	4.50E-05
Stimulant	Caffeine	58-08-2	1.05E+02	9.63E-01	8.59E-02	4.80E-02	1.12E-02	7.51E+01	6.89E-01	6.14E-02	3.43E-02	8.00E-03
Stimulant	Cocaine	50-36-2	7.68E-01	7.05E-03	6.28E-04	3.51E-04	8.18E-05	6.68E-01	6.13E-03	5.46E-04	3.05E-04	7.12E-05
Streoid	Prednisone	53-03-2	4.04E-01	3.71E-03	3.30E-04	1.85E-04	4.30E-05	2.06E-01	1.89E-03	1.68E-04	9.41E-05	2.19E-05
Sulfonamide antibiotic	Sulfadiazine	68-35-9	1.46E-03	1.34E-05	1.19E-06	6.67E-07	1.56E-07	1.46E-03	1.34E-05	1.19E-06	6.67E-07	1.56E-07
Sulfonamide antibiotic	Sulfamethizole	144-82-1	5.11E-03	4.69E-05	4.18E-06	2.33E-06	5.44E-07	5.11E-03	4.69E-05	4.18E-06	2.33E-06	5.44E-07
Sulfonamide antibiotic	Sulfamethoxazole	723-46-6	1.08E+00	9.91E-03	8.83E-04	4.93E-04	1.15E-04	7.48E-01	6.86E-03	6.12E-04	3.42E-04	7.97E-05
Sulfonamide antibiotic	Sulfanilamide	63-74-1	3.48E-02	3.19E-04	2.85E-05	1.59E-05	3.71E-06	3.36E-02	3.08E-04	2.75E-05	1.53E-05	3.58E-06
SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	2.50E+00	2.29E-02	2.04E-03	1.14E-03	2.66E-04	8.67E-01	7.95E-03	7.09E-04	3.96E-04	9.24E-05
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7	1.00E-01	9.17E-04	8.18E-05	4.57E-05	1.07E-05	1.00E-01	9.17E-04	8.18E-05	4.57E-05	1.07E-05
SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4	5.00E-02	4.59E-04	4.09E-05	2.28E-05	5.33E-06	3.59E-02	3.29E-04	2.94E-05	1.64E-05	3.83E-06
SVOCs/PAHs	1-Methylfluorene	1730-37-6	5.00E-02	4.59E-04	4.09E-05	2.28E-05	5.33E-06	3.01E-02	2.76E-04	2.46E-05	1.38E-05	3.21E-06
SVOCs/PAHs	1-Methylnaphthalene	90-12-0	4.27E-01	3.92E-03	3.49E-04	1.95E-04	4.55E-05	4.27E-01	3.92E-03	3.49E-04	1.95E-04	4.55E-05
SVOCs/PAHs	1-Methylphenanthrene	832-69-9	2.85E-02	2.61E-04	2.33E-05	1.30E-05	3.04E-06	2.31E-02	2.12E-04	1.89E-05	1.06E-05	2.46E-06
SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	1.20E+00	1.10E-02	9.81E-04	5.48E-04	1.28E-04	1.01E+00	9.25E-03	8.24E-04	4.60E-04	1.07E-04
SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0	3.44E-01	3.16E-03	2.81E-04	1.57E-04	3.67E-05	3.44E-01	3.16E-03	2.81E-04	1.57E-04	3.67E-05
SVOCs/PAHs	2-Methylanthracene	613-12-7	6.36E-02	5.83E-04	5.20E-05	2.91E-05	6.78E-06	6.36E-02	5.83E-04	5.20E-05	2.91E-05	6.78E-06
SVOCs/PAHs	2-Methylfluoranthene	33543-31-6	1.74E-02	1.60E-04	1.42E-05	7.95E-06	1.85E-06	1.30E-02	1.19E-04	1.06E-05	5.94E-06	1.39E-06
SVOCs/PAHs	2-Methylnaphthalene	91-57-6	5.41E-01	4.96E-03	4.42E-04	2.47E-04	5.76E-05	5.41E-01	4.96E-03	4.42E-04	2.47E-04	5.76E-05
SVOCs/PAHs	2-Methylphenanthrene	2531-84-2	6.47E-02	5.94E-04	5.29E-05	2.96E-05	6.89E-06	4.91E-02	4.50E-04	4.01E-05	2.24E-05	5.23E-06
SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6	1.89E-02	1.73E-04	1.55E-05	8.63E-06	2.01E-06	1.28E-02	1.17E-04	1.05E-05	5.85E-06	1.36E-06
SVOCs/PAHs	3-Methylphenanthrene	832-71-3	5.79E-02	5.31E-04	4.73E-05	2.65E-05	6.17E-06	4.56E-02	4.18E-04	3.73E-05	2.08E-05	4.86E-06
SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5	2.29E-02	2.10E-04	1.87E-05	1.05E-05	2.44E-06	1.54E-02	1.41E-04	1.26E-05	7.04E-06	1.64E-06
SVOCs/PAHs	Acenaphthene	83-32-9	8.21E-02	7.53E-04	6.71E-05	3.75E-05	8.75E-06	6.93E-02	6.36E-04	5.67E-05	3.17E-05	7.38E-06
SVOCs/PAHs	Acenaphthylene	208-96-8	1.25E-02	1.15E-04	1.02E-05	5.71E-06	1.33E-06	8.68E-03	7.96E-05	7.10E-06	3.97E-06	9.25E-07
SVOCs/PAHs	Anthracene	120-12-7	5.53E-02	5.07E-04	4.52E-05	2.53E-05	5.89E-06	4.44E-02	4.07E-04	3.63E-05	2.03E-05	4.73E-06
SVOCs/PAHs	Benz(a)anthracene	56-55-3	2.50E-01	2.29E-03	2.04E-04	1.14E-04	2.66E-05	8.17E-02	7.50E-04	6.68E-05	3.73E-05	8.71E-06
SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2	1.51E-02	1.39E-04	1.23E-05	6.90E-06	1.61E-06	9.67E-03	8.87E-05	7.91E-06	4.42E-06	1.03E-06
SVOCs/PAHs	Benzo(a)pyrene	50-32-8	5.63E-02	5.17E-04	4.60E-05	2.57E-05	6.00E-06	3.22E-02	2.95E-04	2.63E-05	1.47E-05	3.43E-06
SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	4.90E-02	4.50E-04	4.01E-05	2.24E-05	5.22E-06	3.30E-02	3.03E-04	2.70E-05	1.51E-05	3.52E-06
SVOCs/PAHs	Benzo(b)fluorene	243-17-4	4.06E-02	3.72E-04	3.32E-05	1.85E-05	4.33E-06	2.61E-02	2.39E-04	2.13E-05	1.19E-05	2.78E-06
SVOCs/PAHs	Benzo(e)pyrene	192-97-2	5.23E-02	4.80E-04	4.28E-05	2.39E-05	5.57E-06	3.01E-02	2.76E-04	2.46E-05	1.38E-05	3.21E-06
SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	8.33E-02	7.64E-04	6.81E-05	3.81E-05	8.88E-06	3.60E-02	3.30E-04	2.94E-05	1.64E-05	3.84E-06
SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9	3.34E-02	3.06E-04	2.73E-05	1.53E-05	3.56E-06	2.13E-02	1.95E-04	1.74E-05	9.73E-06	2.27E-06
SVOCs/PAHs	Benzothiophene	95-15-8	1.44E-02	1.32E-04	1.18E-05	6.58E-06	1.53E-06	6.83E-03	6.27E-05	5.58E-06	3.12E-06	7.28E-07
SVOCs/PAHs	Biphenyl	92-52-4	1.02E-01	9.36E-04	8.34E-05	4.66E-05	1.09E-05	1.02E-01	9.36E-04	8.34E-05	4.66E-05	1.09E-05
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	9.50E+01	8.72E-01	7.77E-02	4.34E-02	1.01E-02	2.76E+01	2.53E-01	2.26E-02	1.26E-02	2.94E-03
SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	5.62E+00	5.16E-02	4.60E-03	2.57E-03	5.99E-04	3.02E+00	2.77E-02	2.47E-03	1.38E-03	3.21E-04
SVOCs/PAHs	Carbazole	86-74-8	2.01E-01	1.84E-03	1.64E-04	9.18E-05	2.14E-05	1.57E-01	1.44E-03	1.28E-04	7.17E-05	1.67E-05
SVOCs/PAHs	Chrysene/Triphenylene	218-01-9, 217-59-4	6.14E-02	5.63E-04	5.02E-05	2.80E-05	6.54E-06	4.49E-02	4.12E-04	3.67E-05	2.05E-05	4.78E-06
SVOCs/PAHs	cis/trans Decalin	493-01-6	4.84E-01	4.44E-03	3.96E-04	2.21E-04	5.16E-05	4.05E-01	3.72E-03	3.31E-04	1.85E-04	4.32E-05
SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	6.68E-03	6.13E-05	5.46E-06	3.05E-06	7.12E-07	3.85E-03	3.53E-05	3.15E-06	1.76E-06	4.10E-07
SVOCs/PAHs	Dibenzofuran	132-64-9	6.98E-02	6.40E-04	5.71E-05	3.19E-05	7.44E-06	5.11E-02	4.69E-04	4.18E-05	2.33E-05	5.44E-06
SVOCs/PAHs	Dibenzothiophene	132-65-0	3.35E-02	3.07E-04	2.74E-05	1.53E-05	3.57E-06	2.85E-02	2.61E-04	2.33E-05	1.30E-05	3.04E-06

Table C-6. Marine Water Exposure Point Concentrations
AWWU Ecological Risk Evaluation

Chemical Group	Analyte	CAS	Maximum Measured Conc. End of Pipe (ug/L)	Modeled based on Maximum Detected Concentrations[a]				RME EPC (ug/L)	Modeled Reasonable Maximum Concentrations[a]			
				Maximum Modeled Conc. at Edge of ZID (DF=109) (ug/L)	Maximum Modeled Conc. at Knik Arm (DF=1223) (ug/L)	Maximum Modeled Conc. at Mid Upper Cook Inlet (DF=2189) (ug/L)	Maximum Modeled Conc. In Turnagain Arm (DF=9385) (ug/L)		Modeled EPC at Edge of ZID (DF=109) (ug/L)	Modeled EPC at Knik Arm (DF=1223) (ug/L)	Modeled EPC at Mid Upper Cook Inlet (DF=2189) (ug/L)	Modeled EPC In Turnagain Arm (DF=9385) (ug/L)
SVOCs/PAHs	Diethyl Phthalate	84-66-2	3.70E+00	3.39E-02	3.03E-03	1.69E-03	3.94E-04	2.73E+00	2.50E-02	2.23E-03	1.24E-03	2.90E-04
SVOCs/PAHs	Dimethyl Phthalate	131-11-3	1.20E-01	1.10E-03	9.81E-05	5.48E-05	1.28E-05	1.20E-01	1.10E-03	9.81E-05	5.48E-05	1.28E-05
SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	8.40E-01	7.71E-03	6.87E-04	3.84E-04	8.95E-05	7.44E-01	6.83E-03	6.08E-04	3.40E-04	7.93E-05
SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	1.89E+01	1.73E-01	1.55E-02	8.63E-03	2.01E-03	4.56E+00	4.18E-02	3.72E-03	2.08E-03	4.85E-04
SVOCs/PAHs	Fluoranthene	206-44-0	3.17E-01	2.91E-03	2.59E-04	1.45E-04	3.38E-05	2.18E-01	2.00E-03	1.78E-04	9.96E-05	2.32E-05
SVOCs/PAHs	Fluorene	86-73-7	1.26E-01	1.16E-03	1.03E-04	5.76E-05	1.34E-05	9.70E-02	8.90E-04	7.93E-05	4.43E-05	1.03E-05
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	4.44E-02	4.07E-04	3.63E-05	2.03E-05	4.73E-06	1.98E-02	1.82E-04	1.62E-05	9.05E-06	2.11E-06
SVOCs/PAHs	Isophorone	78-59-1	3.80E-01	3.49E-03	3.11E-04	1.74E-04	4.05E-05	3.80E-01	3.49E-03	3.11E-04	1.74E-04	4.05E-05
SVOCs/PAHs	Naphthalene	91-20-3	9.80E-01	8.99E-03	8.01E-04	4.48E-04	1.04E-04	2.50E-01	2.29E-03	2.04E-04	1.14E-04	2.66E-05
SVOCs/PAHs	Naphthobenzothiophene	205-43-6	3.37E-02	3.09E-04	2.76E-05	1.54E-05	3.59E-06	2.16E-02	1.98E-04	1.77E-05	9.87E-06	2.30E-06
SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	9.60E+00	8.81E-02	7.85E-03	4.39E-03	1.02E-03	9.60E+00	8.81E-02	7.85E-03	4.39E-03	1.02E-03
SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	6.30E+00	5.78E-02	5.15E-03	2.88E-03	6.71E-04	6.30E+00	5.78E-02	5.15E-03	2.88E-03	6.71E-04
SVOCs/PAHs	Perylene	198-55-0	3.33E-02	3.06E-04	2.72E-05	1.52E-05	3.55E-06	2.10E-02	1.93E-04	1.72E-05	9.59E-06	2.24E-06
SVOCs/PAHs	Phenanthrene	85-01-8	9.80E-01	8.99E-03	8.01E-04	4.48E-04	1.04E-04	4.16E-01	3.82E-03	3.40E-04	1.90E-04	4.43E-05
SVOCs/PAHs	Phenol	108-95-2	5.45E+01	5.00E-01	4.46E-02	2.49E-02	5.81E-03	2.49E+01	2.28E-01	2.03E-02	1.14E-02	2.65E-03
SVOCs/PAHs	Pyrene	129-00-0	4.70E-01	4.31E-03	3.84E-04	2.15E-04	5.01E-05	2.20E-01	2.02E-03	1.80E-04	1.01E-04	2.34E-05
SVOCs/PAHs	Retene	483-65-8	1.08E-02	9.91E-05	8.83E-06	4.93E-06	1.15E-06	1.00E-02	9.17E-05	8.18E-06	4.57E-06	1.07E-06
SVOCs/PAHs	Total PAHs	#N/A	8.18E+00	7.50E-02	6.69E-03	3.74E-03	8.71E-04	6.68E+00	6.13E-02	5.46E-03	3.05E-03	7.12E-04
Tetracycline antibiotic	Doxycycline	564-25-0	1.50E-01	1.38E-03	1.23E-04	6.85E-05	1.60E-05	1.50E-01	1.38E-03	1.23E-04	6.85E-05	1.60E-05
Tetracycline antibiotic	Tetracycline [TC]	60-54-8	9.79E-02	8.98E-04	8.00E-05	4.47E-05	1.04E-05	9.79E-02	8.98E-04	8.00E-05	4.47E-05	1.04E-05
Tranquilizer	Meprobamate	57-53-4	3.83E-01	3.51E-03	3.13E-04	1.75E-04	4.08E-05	2.00E-01	1.83E-03	1.64E-04	9.14E-05	2.13E-05
Urinary steroid	Androsterone	53-41-8	5.71E-02	5.24E-04	4.67E-05	2.61E-05	6.08E-06	5.71E-02	5.24E-04	4.67E-05	2.61E-05	6.08E-06
VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	7.90E-01	7.25E-03	6.46E-04	3.61E-04	8.42E-05	7.90E-01	7.25E-03	6.46E-04	3.61E-04	8.42E-05
VOCs	1,2-Dichloroethane (EDC)	107-06-2	8.00E-02	7.34E-04	6.54E-05	3.65E-05	8.52E-06	8.00E-02	7.34E-04	6.54E-05	3.65E-05	8.52E-06
VOCs	1,4-Dichlorobenzene	106-46-7	8.40E-01	7.71E-03	6.87E-04	3.84E-04	8.95E-05	6.15E-01	5.64E-03	5.03E-04	2.81E-04	6.55E-05
VOCs	2-Butanone (MEK)	78-93-3	6.80E+01	6.24E-01	5.56E-02	3.11E-02	7.25E-03	3.64E+01	3.34E-01	2.98E-02	1.66E-02	3.88E-03
VOCs	2-Hexanone	591-78-6	5.70E+00	5.23E-02	4.66E-03	2.60E-03	6.07E-04	1.75E+00	1.60E-02	1.43E-03	7.98E-04	1.86E-04
VOCs	Acetone	67-64-1	3.00E+02	2.75E+00	2.45E-01	1.37E-01	3.20E-02	2.20E+02	2.02E+00	1.80E-01	1.00E-01	2.34E-02
VOCs	Acrolein	107-02-8	1.30E+00	1.19E-02	1.06E-03	5.94E-04	1.39E-04	1.16E+00	1.06E-02	9.44E-04	5.28E-04	1.23E-04
VOCs	Benzene	71-43-2	7.80E-01	7.16E-03	6.38E-04	3.56E-04	8.31E-05	2.50E-01	2.29E-03	2.04E-04	1.14E-04	2.66E-05
VOCs	Bromodichloromethane	75-27-4	8.00E-02	7.34E-04	6.54E-05	3.65E-05	8.52E-06	6.97E-02	6.39E-04	5.70E-05	3.18E-05	7.43E-06
VOCs	Bromomethane	74-83-9	9.00E-02	8.26E-04	7.36E-05	4.11E-05	9.59E-06	9.00E-02	8.26E-04	7.36E-05	4.11E-05	9.59E-06
VOCs	Carbon Disulfide	75-15-0	7.00E-01	6.42E-03	5.72E-04	3.20E-04	7.46E-05	5.74E-01	5.27E-03	4.69E-04	2.62E-04	6.12E-05
VOCs	Chlorobenzene	108-90-7	8.00E-02	7.34E-04	6.54E-05	3.65E-05	8.52E-06	4.35E-02	3.99E-04	3.56E-05	1.99E-05	4.64E-06
VOCs	Chloroethane	75-00-3	6.90E-01	6.33E-03	5.64E-04	3.15E-04	7.35E-05	3.29E-01	3.02E-03	2.69E-04	1.50E-04	3.51E-05
VOCs	Chloroform	67-66-3	3.95E+00	3.62E-02	3.23E-03	1.80E-03	4.21E-04	2.91E+00	2.67E-02	2.38E-03	1.33E-03	3.10E-04
VOCs	Chloromethane	74-87-3	1.90E+00	1.74E-02	1.55E-03	8.68E-04	2.02E-04	1.20E+00	1.10E-02	9.84E-04	5.50E-04	1.28E-04
VOCs	cis-1,2-Dichloroethene	156-59-2	7.00E-02	6.42E-04	5.72E-05	3.20E-05	7.46E-06	4.35E-02	3.99E-04	3.56E-05	1.99E-05	4.64E-06
VOCs	Dichloromethane (Methylene Ch	75-09-2	6.85E+00	6.28E-02	5.60E-03	3.13E-03	7.30E-04	3.08E+00	2.82E-02	2.52E-03	1.41E-03	3.28E-04
VOCs	Ethylbenzene	100-41-4	1.50E+00	1.38E-02	1.23E-03	6.85E-04	1.60E-04	6.21E-01	5.70E-03	5.08E-04	2.84E-04	6.62E-05
VOCs	m,p-Xylenes	179601-23-1	6.20E+00	5.69E-02	5.07E-03	2.83E-03	6.61E-04	2.21E+00	2.02E-02	1.80E-03	1.01E-03	2.35E-04
VOCs	o-Xylene	95-47-6	2.60E+00	2.39E-02	2.13E-03	1.19E-03	2.77E-04	9.98E-01	9.16E-03	8.16E-04	4.56E-04	1.06E-04
VOCs	Styrene	100-42-5	5.50E+00	5.05E-02	4.50E-03	2.51E-03	5.86E-04	1.78E+00	1.63E-02	1.45E-03	8.11E-04	1.89E-04
VOCs	Tetrachloroethene (PCE)	127-18-4	6.00E-01	5.50E-03	4.91E-04	2.74E-04	6.39E-05	3.25E-01	2.98E-03	2.66E-04	1.48E-04	3.46E-05
VOCs	Toluene	108-88-3	1.60E+01	1.47E-01	1.31E-02	7.31E-03	1.70E-03	8.83E+00	8.10E-02	7.22E-03	4.04E-03	9.41E-04
VOCs	Trichloroethene (TCE)	79-01-6	7.00E-02	6.42E-04	5.72E-05	3.20E-05	7.46E-06	4.46E-02	4.09E-04	3.65E-05	2.04E-05	4.75E-06
VOCs	Vinyl Chloride	75-01-4	2.00E-02	1.83E-04	1.64E-05	9.14E-06	2.13E-06	2.00E-02	1.83E-04	1.64E-05	9.14E-06	2.13E-06

Notes:

[a] Modeled concentrations calculated using end of pipe effluent concentratin multiplied by the applicable dilution factor established in the Outfall Mixing Zone Study and the Far-field Mixing Zone Model (Jacobs, 2024).
DF - dilution factor

Table C-7. Toxicity Benchmarks for Prey Fish Exposed to Marine Water

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS	Analyte Surrogate[a]	Chronic BM[b] (µg/L)	Endpoint[c,d,e]	Source
Metals	Antimony	7440-36-0	--	4300	Chronic ESV	EPA, 2018
Metals	Arsenic	7440-38-2	--	36	Marine Chronic (total)	NRWQC EPA, 2024
Metals	Beryllium	7440-41-7	--	0.13	Chronic ESV	EPA, 2018
Metals	Cadmium	7440-43-9	--	7.95	Marine Chronic (total)	NRWQC EPA, 2024
Metals	Chromium	7440-47-3	--	50.35	Marine Chronic (total)	NRWQC EPA, 2024
Metals	Copper	7440-50-8	--	3.73	Marine Chronic (total)	NRWQC EPA, 2024
Metals	Dissolved Antimony	7440-36-0	--	4300	Chronic ESV	EPA, 2018
Metals	Dissolved Arsenic	7440-38-2	--	36	Site Specific Chronic	ADEC 2025
Metals	Dissolved Beryllium	7440-41-7	--	0.13	Chronic ESV	EPA, 2018
Metals	Dissolved Cadmium	7440-43-9	--	7.9	Marine Chronic	NRWQC EPA, 2024
Metals	Dissolved Chromium	7440-47-3	--	50	Site Specific Chronic	ADEC 2025
Metals	Dissolved Copper	7440-50-8	--	3.1	Site Specific Chronic	ADEC 2025
Metals	Dissolved Lead	7439-92-1	--	8.1	Site Specific Chronic	ADEC 2025
Metals	Dissolved Mercury	7439-97-6	--	0.025	Site Specific Chronic	ADEC 2025
Metals	Dissolved Molybdenum	7439-98-7	--	73	Adjusted Chronic	Birge et al., 1979
Metals	Dissolved Nickel	7440-02-0	--	8.20	Marine Chronic	NRWQC EPA, 2024
Metals	Dissolved Selenium	7782-49-2	--	71	Marine Chronic	NRWQC EPA, 2024
Metals	Dissolved Silver	7440-22-4	--	0.19	Marine Acute/10	NRWQC EPA, 2024
Metals	Dissolved Thallium	7440-28-0	--	6.3	Chronic ESV	EPA, 2018
Metals	Dissolved Zinc	7440-66-6	--	81	Site Specific Chronic	ADEC 2025
Metals	Lead	7439-92-1	--	8.52	Marine Chronic (total)	NRWQC EPA, 2024
Metals	Mercury	7439-97-6	--	0.03	Site Specific Chronic	ADEC 2025
Metals	Molybdenum	7439-98-7	--	73	Adjusted Chronic	Birge et al., 1979
Metals	Nickel	7440-02-0	--	8.28	Marine Chronic (total)	NRWQC EPA, 2024
Metals	Selenium	7782-49-2	--	71.14	Marine Chronic (total)	NRWQC EPA, 2024
Metals	Silver	7440-22-4	--	0.22	Marine Acute/10 (total)	NRWQC EPA, 2024
Metals	Thallium	7440-28-0	--	6.3	Chronic ESV	EPA, 2018
Metals	Zinc	7440-66-6	--	85.62	Marine Chronic (total)	NRWQC EPA, 2024
Ammonia	Total Ammonia	7664-41-7	--	16500	Marine Chronic[f]	NRWQC EPA, 2024
Cyanide	Cyanide, Total	57-12-5	--	1	Marine Chronic	NRWQC EPA, 2024
ACE inhibitor	Enalapril	75847-73-3	--	0.16	Predicted Chronic	Norman, 2024
Anabolic agent	Androstenedione	63-05-8	--	1050	Adjusted Chronic	Hunsinger et al. 1991
Analgesic	Ibuprofen	15687-27-1	--	680	Chronic	Overturf et al. 2012
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	51146-55-5	Ibuprofen	680	Chronic	*See Surrogate
Anti-acid reflux	Ranitidine	66357-35-5	--	10000	Adjusted Chronic	Isidori et al., 2009
Antiasthmatic	Albuterol	18559-94-9	--	100	Chronic	AstraZeneca, 2023
Antiasthmatic	Theophylline	58-55-9	--	9638.9	Adjusted Chronic	Pruvot et al., 2012
Antibacterial	Penicillin V	87-08-1	Penicillin	1000	Adjusted Chronic	Carballeira et al., 2012
Antibiotic	4-Epitetracycline [ETC]	23313-80-6	tetracycline	22000	Adjusted Chronic	*See Surrogate
Antibiotic	Enrofloxacin	93106-60-6	--	10000	Chronic	Robinson et al., 2005
Anticonvulsant	Benztropine	86-13-5	--	0.027	Predicted Chronic	Norman, 2024
Anticonvulsant	Carbamazepine	298-46-4	--	25000	Chronic	Ferrari et al, 2004
Antidepressant	10-hydroxy-amitriptyline	1159-82-6	Amitriptyline	1	Adjusted Chronic	*See Surrogate
Antidepressant	Amitriptyline	50-48-6	--	27.74	Adjusted Chronic	Yang et al., 2014
Antidiabetic drug	Glipizide	29094-61-9	--	10000	Adjusted Chronic	Cunningham et al., 2006
Antidiabetic drug	Glyburide	10238-21-8	--	4940	Adjusted Chronic	Gustafson et al., 2012
Antidiabetic drug	Metformin	657-24-9	--	322	Chronic	Parrott et al., 2021
Antifungal agent	Miconazole	22916-47-8	--	33.3	Adjusted Chronic	Beijer et al., 2018

Table C-7. Toxicity Benchmarks for Prey Fish Exposed to Marine Water

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS	Analyte Surrogate[a]	Chronic BM[b] (µg/L)	Endpoint[c,d,e]	Source
Antihistamine	Diphenhydramine	58-73-1	--	2809	Adjusted Chronic	Selderslaghs et al. 2012
Antihistamine	Promethazine	60-87-7	--	1.81	Adjusted Chronic	Ignoto et al., 2022
Antihypertensive	Desmethyldiltiazem	84903-78-6	--	0.1	Adjusted Chronic	Crago, J. and Klaper, 2018.
Antihypertensive	Diltiazem	42399-41-7	--	0.1	Adjusted Chronic	Crago, J. and Klaper, 2018.
Antihypertensive	Valsartan	137862-53-4	--	56	Predicted Chronic	Norman, 2024
Antihypertensive	Verapamil	52-53-9	--	26.18	Chronic	Li et al., 2011
Antilipemic	Gemfibrozil	25812-30-0	--	1558	Chronic	Skolness et al. 2013
Antimicrobial, disinfectant	Triclocarban	101-20-2	--	0.046	Adjusted Chronic	E.G and G Bionomics, 1992
Antimicrobial, disinfectant	Triclosan	3380-34-5	--	15.1	Chronic	Orvos et al., 2002
Antipyretic, analgesic	Acetaminophen	103-90-2	--	81400	Adjusted Chronic	Broderius et al., 1995
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	611-59-6	Caffine	2000	Adjusted Chronic	*See Surrogate
Betablocker	Atenolol	29122-68-7	--	750	Adjusted Chronic	Zhang, X. and Gong, 2013
Betablocker	Metoprolol	51384-51-1	--	10000	Adjusted Chronic	Huggett et al., 2002
Betablocker	Propranolol	525-66-6	--	4.11	Chronic	Lorenzi et al., 2012
BloodThinner	Warfarin	81-81-2	--	1400	Adjusted Chronic	Tooby et al., 1975
ChannelBlocker	Amlodipine	88150-42-9	--	100	Adjusted Chronic	Pascoe et al., 2003
ChannelBlocker	Dehydronifedipine	67035-22-7	--	0.0021	Predicted Chronic	Norman, 2024
ChannelBlocker	Norverapamil	67018-85-3	--	270	Adjusted Chronic	Li et al., 2010
Cocaine metabolite	Benzoylecgonine	519-09-5	Cocaine	62.5	Adjusted Chronic	*See Surrogate
Contraceptive	Norgestrel	6533-00-2	--	0.59	Predicted Chronic	Norman et al., 2024
Corticosteroid	Hydrocortisone	50-23-7	--	28.8	Predicted Chronic	Norman, 2024
Depressant	Alprazolam	28981-97-7	--	0.0077	Predicted Chronic	Norman, 2024
Depressant	Diazepam	439-14-5	--	291	Chronic	Oggier et al., 2010
Diuretic	Furosemide	54-31-9	--	3.13	Predicted Chronic	Norman, 2024
Diuretic	Hydrochlorothiazide	58-93-5	--	10	Predicted Chronic	Norman, 2024
Diuretic	Triamterene	396-01-0	--	1300	Adjusted Chronic	Moehs, 2016
Flame Retardant	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-209)	1163-19-5	--	30	Chronic	Hanz et al., 2017
Flame Retardant	2,2',3,3',4,4',5,6,6'-NoBDE	32534-81-9	--	50000	Adjusted Chronic	Great Lakes, 2000
Flame Retardant	2,2',3,4,4',5,5',6-OcBDE	337513-72-1	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,2',3,4,4',5',6-HpBDE	207122-16-5	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,2',3,4,4',5'-HxBDE	182677-30-1	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,2',3,4,4',6'-HxBDE	243982-83-4	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,2',3,4,4'-PeBDE	182346-21-0	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,2',4,4',5,5'-HxBDE	68631-49-2	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,2',4,4',5,6'-HxBDE	207122-15-4	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,2',4,4',5-PeBDE (BDE-99)	60348-60-9	--	3.828	Adjusted Chronic	Mhadhbi et al. 2011
Flame Retardant	2,2',4,4',6,6'-HxBDE	35854-94-5	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,2',4,4',6-PeBDE	189084-64-8	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,2',4,4'-TeBDE (BDE-47)	5436-43-1	--	2.735	Adjusted Chronic	Mhadhbi et al. 2011
Flame Retardant	2,2',4,5'-TeBDE	243982-82-3	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,2',4,6'-TeBDE	189084-57-9	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,2',4-TriBDE	147217-75-2	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,3',4,4',6-PeBDE	189084-66-0	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,3',4,4'-TeBDE	189084-61-5	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,3',4',6-TeBDE	189084-62-6	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Flame Retardant	2,4,4'-TriBDE	41318-75-6	2,2',4,4'-TeBDE (BDE-47)	2.735	Adjusted Chronic	*See Surrogate
Fungicide and parasiticide	Thiabendazole	148-79-8	--	360	Adjusted Chronic	EPA, 1992
Glycoside	Digoxin	20830-75-5	--	999617	Adjusted Chronic	Calleja, M.C. and Persoone, 1992

Table C-7. Toxicity Benchmarks for Prey Fish Exposed to Marine Water

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS	Analyte Surrogate[a]	Chronic BM[b] (µg/L)	Endpoint[c,d,e]	Source
Lincosamide antibiotic	Lincomycin	154-21-2	--	100000	Adjusted Chronic	Isidori et al., 2005
Macrolide antibiotic	Azithromycin	83905-01-5	--	12000	Adjusted Chronic	Webb, S.F., 2001
Macrolide antibiotic	Clarithromycin	81103-11-9	--	10000	Adjusted Chronic	Kim et al., 2009
Macrolide antibiotic	Erythromycin-H2O	114-07-8	--	34900	Adjusted Chronic	Bills et al., 1993
Macrolide antibiotic	Roxithromycin	80214-83-1	--	0.1	Predicted Chronic	Norman, 2024
Macrolide antibiotic	Tylosin	1401-69-0	--	0.4	Predicted Chronic	Norman, 2024
Nicotinemetabolite	Cotinine	486-56-6	--	55.3	Predicted Chronic	Norman, 2024
Non-steroidalanti-inflammatory dru	Naproxen	22204-53-1	--	1000	Adjusted Chronic	Bereketoglu et al., 2020
Oil & Grease	Oil and Grease, Total (HEM)	--	--	--	--	--
Opiate	Codeine	76-57-3	--	0.72	Predicted Chronic	Norman, 2024
Opiate	Hydrocodone	125-29-1	--	0.41	Predicted Chronic	Norman, 2024
Opiate	Oxycodone	76-42-6	--	0.8	Predicted Chronic	Norman et al., 2024
Opiod	Propoxyphene	469-62-5	--	0.045	Predicted Chronic	Norman, 2024
Pesticides	2,4'-DDD	53-19-0	--	0.007	Adjusted Chronic	Mayer, F.L. and Ellersieck, 1986
Pesticides	4,4'-DDD	72-54-8	--	0.084	Chronic ESV	EPA, 2018
Pesticides	4,4'-DDE	72-55-9	--	0.14	Chronic ESV	EPA, 2018
Pesticides	4,4'-DDT	50-29-3	--	0.001	Marine Chronic	NRWQC EPA, 2024
Pesticides	Aldrin	309-00-2	--	0.0001	Chronic ESV	EPA, 2018
Pesticides	Chlordane, alpha (cis)	5103-71-9	--	0.709	Adjusted Chronic	Mayer et al., 1986
Pesticides	Chlorpyriphos	2921-88-2	--	0.04	Adjusted Chronic	Borthwick et al., 1985
Pesticides	Chlorpyriphos-Methyl	5598-13-0	--	0.015	Adjusted Chronic	Hansen, D.J., 1980
Pesticides	Cypermethrin	52315-07-8	--	0.048	Adjusted Chronic	EPA, 1992
Pesticides	DEET	134-62-3	--	5600	Adjusted Chronic	EPA, 1992
Pesticides	Demeton-O,S	126-75-0	--	0.1	Chronic ESV	EPA, 2018
Pesticides	Dieldrin	60-57-1	--	0.0019	Marine Acute	NRWQC EPA, 2024
Pesticides	Dieldrin	60-57-1	--	0.0019	Marine Acute	NRWQC EPA, 2024
Pesticides	Endosulfan Sulfate	1031-07-8	--	0.0087	Marine Chronic	NRWQC EPA, 2024
Pesticides	Endrin	72-20-8	--	0.0023	Marine Chronic	NRWQC EPA, 2024
Pesticides	Endrin Ketone	53494-70-5	Endrin	0.0023	Marine Chronic	NRWQC EPA, 2024
Pesticides	HCH, alpha	319-84-6	--	0.046	Chronic ESV	EPA, 2018
Pesticides	HCH, beta	319-85-7	--	0.046	Chronic ESV	EPA, 2018
Pesticides	HCH, gamma	58-89-9	--	0.02	Chronic ESV	EPA, 2018
Pesticides	Heptachlor	76-44-8	--	0.0036	Marine Chronic	NRWQC EPA, 2024
Pesticides	Hexachlorobenzene	118-74-1	--	0.15	Chronic ESV	EPA, 2018
Pesticides	Malathion	121-75-5	--	0.1	Marine Chronic	NRWQC EPA, 2024
Pesticides	Methoxychlor	72-43-5	--	0.03	Chronic ESV	EPA, 2018
Pesticides	Permethrin	52645-53-1	--	0.22	Adjusted Chronic	Schimmel et al., 1983
PFAS	5:3 FTCA	914637-49-3	--	24.97	Adjusted Chronic	Rericha et al., 2021
PFAS	PFBA	375-22-4	--	11	Chronic	Valsecchi et al., 2017
PFAS	PFHpA	375-85-9	--	2330	Adjusted Chronic	Truong et al., 2014
PFAS	PFHxA	307-24-4	--	544	Chronic	Argonne, 2024
PFAS	PFHxS	355-46-4	--	14.1	Chronic	Argonne, 2024
PFAS	PFNA	375-95-1	--	0.116	Chronic	Argonne, 2024
PFAS	PFOA	335-67-1	--	3.16	Chronic	Argonne, 2024
PFAS	PFOS	1763-23-1	--	0.0167	Chronic	Argonne, 2024
PFAS	PFPeA	2706-90-3	--	3.2	Chronic	Valsecchi et al., 2017
PFAS	PFPeS	175905-36-9	PFPeA	3.2	Chronic	*See Surrogate
Plasticizer	Bisphenol A	80-05-7	--	1.75	Adjusted Chronic	Lahnsteiner,F., et al. 2005 (2005)

Table C-7. Toxicity Benchmarks for Prey Fish Exposed to Marine Water

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS	Analyte Surrogate[a]	Chronic BM[b] (µg/L)	Endpoint[c,d,e]	Source
Plasticizer	Bisphenol S	80-09-1	--	32870	Adjusted Chronic	Ji et al., 2022
Pyrimidine antibiotic	Trimethoprim	738-70-5	--	157	Chronic	Maduerira et al., 2011
Quinoline antibiotic	Ciprofloxacin	85721-33-1	--	10000	Adjusted Chronic	Shahnaz et al., 2021
Quinoline antibiotic	Ofloxacin	82419-36-1	--	10000	Chronic	Robinson et al. 2005
Rubber Stabilizing compound	6PPD-Quinone	2754428-18-5	--	6.731	Adjusted Chronic	Lo et al., 2023
Sex hormone	17 beta-Estradiol	50-28-2	--	0.097	Chronic	Robinson et al., 2007
Sex hormone	Estrone	53-16-7	--	3.701	Chronic	Imai et al., 2007
Sex hormone	Progesterone	57-83-0	--	0.93	Chronic	Huang et al., 2013
Sex hormone	Testosterone	58-22-0	--	5	Chronic	Hemmer et al., 2011
SSRI Antidepressant	Fluoxetine	54910-89-3	--	5	Chronic	Foran et al., 2004
SSRI Antidepressant	Norfluoxetine	83891-03-6	--	0.109	Chronic	Chai et al., 2021
SSRI Antidepressant	Paroxetine	61869-08-7	--	58	Adjusted Chronic	Henry et al., 2004
SSRI Antidepressant	Sertraline	79617-96-2	--	14.3	Adjusted Chronic	Jonson, D.J., 2004
Statin	Atorvastatin	134523-00-5	--	2400	Chronic	Dussault et al., 2008
Steroid	Methylprednisolone	83-43-2	--	1.74	Predicted Chronic	Norman, 2024
Steroid	Prednisolone	50-24-8	--	2229	Adjusted Chronic	DellaGreca et al., 2004
Steroidal Estrogen	Equilenin	517-09-9	--	0.053	Predicted Chronic	Norman, 2024
Stimulant	Amphetamine	300-62-9	--	2.48	Predicted Chronic	Norman, 2024
Stimulant	Caffeine	58-08-2	--	2000	Adjusted Chronic	DeYoung et al., 1996
Stimulant	Cocaine	50-36-2	--	62.5	Adjusted Chronic	Maranho et al., 2017
Streoid	Prednisone	53-03-2	Prednisolone	2229	Adjusted Chronic	*See Surrogate
Sulfonamide antibiotic	Sulfadiazine	68-35-9	--	200000	Chronic	Ramaiah et al., 1989
Sulfonamide antibiotic	Sulfamethizole	144-82-1	--	0.15	Predicted Chronic	Norman, 2024
Sulfonamide antibiotic	Sulfamethoxazole	723-46-6	--	533	Chronic	Maduerira et al., 2011
Sulfonamide antibiotic	Sulfanilamide	63-74-1	--	1.75	Predicted Chronic	Norman, 2024
SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	--	30	Chronic ESV	EPA, 2018
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7	--	10	Chronic ESV	EPA, 2018
SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4	C1-Dibenzothiophene	16	Chronic ESV	EPA, 2018
SVOCs/PAHs	1-Methylfluorene	1730-37-6	C1-Flourenes	14	Chronic ESV	EPA, 2018
SVOCs/PAHs	1-Methylnaphthalene	90-12-0	--	52	Chronic ESV	EPA, 2018
SVOCs/PAHs	1-Methylphenanthrene	832-69-9	--	7.49	Chronic ESV	EPA, 2018
SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	--	6.5	Chronic ESV	EPA, 2018
SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0	--	26	Chronic ESV	EPA, 2018
SVOCs/PAHs	2-Methylanthracene	613-12-7	Anthracene	0.43	Chronic ESV	EPA, 2018
SVOCs/PAHs	2-Methylfluoranthene	33543-31-6	C2-Fluoranthene	1.1	Chronic ESV	EPA, 2018
SVOCs/PAHs	2-Methylnaphthalene	91-57-6	--	52	Chronic ESV	EPA, 2018
SVOCs/PAHs	2-Methylphenanthrene	2531-84-2	1-Methylphenanthrene	7.49	Chronic ESV	EPA, 2018
SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6	C3-phenanthrene	1.3	Chronic ESV	EPA, 2018
SVOCs/PAHs	3-Methylphenanthrene	832-71-3	1-Methylphenanthrene	7.49	Chronic ESV	EPA, 2018
SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5	Dibenzothiophene	48	Chronic ESV	EPA, 2018
SVOCs/PAHs	Acenaphthene	83-32-9	--	15	Chronic ESV	EPA, 2018
SVOCs/PAHs	Acenaphthylene	208-96-8	--	28	Chronic ESV	EPA, 2018
SVOCs/PAHs	Anthracene	120-12-7	--	0.43	Chronic ESV	EPA, 2018
SVOCs/PAHs	Benz(a)anthracene	56-55-3	--	0.35	Chronic ESV	EPA, 2018
SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2	Benzo(b)fluoranthene	0.06	Chronic ESV	EPA, 2018
SVOCs/PAHs	Benzo(a)pyrene	50-32-8	--	0.02	Chronic ESV	EPA, 2018
SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	--	0.06	Chronic ESV	EPA, 2018
SVOCs/PAHs	Benzo(b)fluorene	243-17-4	--	1	Adjusted Chronic	Lampi et al., 2005

Table C-7. Toxicity Benchmarks for Prey Fish Exposed to Marine Water

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS	Analyte Surrogate[a]	Chronic BM[b] (µg/L)	Endpoint[c,d,e]	Source
SVOCs/PAHs	Benzo(e)pyrene	192-97-2	--	0.9	Chronic ESV	EPA, 2018
SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	--	0.012	Chronic ESV	EPA, 2018
SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9	--	0.06	Chronic ESV	EPA, 2018
SVOCs/PAHs	Benzothiophene	95-15-8	--	450	Chronic ESV	EPA, 2018
SVOCs/PAHs	Biphenyl	92-52-4	--	49	Chronic ESV	EPA, 2018
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	--	6	Chronic ESV	EPA, 2018
SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	--	18	Chronic ESV	EPA, 2018
SVOCs/PAHs	Carbazole	86-74-8	--	112	Chronic ESV	EPA, 2018
SVOCs/PAHs	Chrysene/Triphenylene	218-01-9	--	0.35	Chronic ESV	EPA, 2018
SVOCs/PAHs	cis/trans Decalin	493-01-6	Naphthalene	1.4	Chronic ESV	EPA, 2018
SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	--	0.01	Chronic ESV	EPA, 2018
SVOCs/PAHs	Dibenzofuran	132-64-9	--	61	Chronic ESV	EPA, 2018
SVOCs/PAHs	Dibenzothiophene	132-65-0	--	48	Chronic ESV	EPA, 2018
SVOCs/PAHs	Diethyl Phthalate	84-66-2	--	59	Chronic ESV	EPA, 2018
SVOCs/PAHs	Dimethyl Phthalate	131-11-3	--	3295	Chronic ESV	EPA, 2018
SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	--	27	Chronic ESV	EPA, 2018
SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	--	215	Chronic ESV	EPA, 2018
SVOCs/PAHs	Fluoranthene	206-44-0	--	0.82	Chronic ESV	EPA, 2018
SVOCs/PAHs	Fluorene	86-73-7	--	24	Chronic ESV	EPA, 2018
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	--	0.012	Chronic ESV	EPA, 2018
SVOCs/PAHs	Isophorone	78-59-1	--	996	Chronic ESV	EPA, 2018
SVOCs/PAHs	Naphthalene	91-20-3	--	1.4	Chronic ESV	EPA, 2018
SVOCs/PAHs	Naphthobenzothiophene	205-43-6	--	22	Adjusted Chronic	Eastmond et al., 1984
SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	--	830000	Adjusted Chronic	Ferraro et al., 1977
SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	--	7.9	Chronic ESV	EPA, 2018
SVOCs/PAHs	Perylene	198-55-0	--	0.9	Chronic ESV	EPA, 2018
SVOCs/PAHs	Phenanthrene	85-01-8	--	4.6	Chronic ESV	EPA, 2018
SVOCs/PAHs	Phenol	108-95-2	--	58	Chronic ESV	EPA, 2018
SVOCs/PAHs	Pyrene	129-00-0	--	0.11	Chronic ESV	EPA, 2018
SVOCs/PAHs	Retene	483-65-8	--	100	Chronic	Billiard et al., 1999
Tetracycline antibiotic	Doxycycline	564-25-0	--	2000	Adjusted Chronic	Zhu et al., 2021
Tetracycline antibiotic	Tetracycline [TC]	60-54-8	oxytetracycline	11010	Adjusted Chronic	*See Surrogate
Tranquilizer	Meprobamate	57-53-4	--	2.7	Predicted Chronic	Norman, 2024
Urinary steroid	Androsterone	53-41-8	--	50	Chronic	Peyon et al., 1997
VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	--	2097	Chronic ESV	EPA, 2018
VOCs	1,2-Dichloroethane (EDC)	107-06-2	--	5650	Chronic ESV	EPA, 2018
VOCs	1,4-Dichlorobenzene	106-46-7	--	115	Chronic ESV	EPA, 2018
VOCs	2-Butanone (MEK)	78-93-3	--	65,695	Chronic ESV	EPA, 2018
VOCs	2-Hexanone	591-78-6	--	16,871	Chronic ESV	EPA, 2018
VOCs	Acetone	67-64-1	--	117,629	Chronic ESV	EPA, 2018
VOCs	Acrolein	107-02-8	--	1.8	Chronic ESV	EPA, 2018
VOCs	Benzene	71-43-2	--	110	Chronic ESV	EPA, 2018
VOCs	Bromodichloromethane	75-27-4	--	3510	Chronic ESV	EPA, 2018
VOCs	Bromomethane	74-83-9	--	265	Chronic ESV	EPA, 2018
VOCs	Carbon Disulfide	75-15-0	--	253	Chronic ESV	EPA, 2018
VOCs	Chlorobenzene	108-90-7	--	25	Chronic ESV	EPA, 2018
VOCs	Chloroethane	75-00-3	Chloromethane	27000	Adjusted Chronic	*See Surrogate
VOCs	Chloroform	67-66-3	--	471	Chronic ESV	EPA, 2018

Table C-7. Toxicity Benchmarks for Prey Fish Exposed to Marine Water

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS	Analyte Surrogate[a]	Chronic BM[b] (µg/L)	Endpoint[c,d,e]	Source
VOCs	Chloromethane	74-87-3	--	27000	Adjusted Chronic	Dawson et al., 1977
VOCs	cis-1,2-Dichloroethene	156-59-2	1,1-Dichloroethene	3.2	Chronic ESV	EPA, 2018
VOCs	Dichloromethane (Methylene Chloride)	75-09-2	--	1580	Chronic ESV	EPA, 2018
VOCs	Ethylbenzene	100-41-4	--	25	Chronic ESV	EPA, 2018
VOCs	m,p-Xylenes	179601-23-1	--	260	Chronic ESV	EPA, 2018
VOCs	o-Xylene	95-47-6	--	260	Chronic ESV	EPA, 2018
VOCs	Styrene	100-42-5	--	412	Chronic ESV	EPA, 2018
VOCs	Tetrachloroethene (PCE)	127-18-4	--	8.85	Chronic ESV	EPA, 2018
VOCs	Toluene	108-88-3	--	215	Chronic ESV	EPA, 2018
VOCs	Trichloroethene (TCE)	79-01-6	--	81	Chronic ESV	EPA, 2018
VOCs	Vinyl Chloride	75-01-4	--	22760	Chronic ESV	EPA, 2018

Notes:

[a] If no reliable toxicity data was available, a surrogate analyte with similar composition or assumed toxic action was selected.

[b] Aquatic benchmarks were selected using the following sources as described in the **Appendix C** text.
-Site Specific Water Quality Criteria (SSWQC) for Cook Inlet (ADEC 2025)
-Chronic Marine National Reccomended Water Quality Criteria (NRWQC; EPA, 2024)
-Final chronic values for PAHs (EPA, 2012)
-No Effect and Low Effect BMs from LANL (2022).
-EPA Region 4 marine chronic screening benchmarks (2018).
-Literature/study derived toxicity values
-Norman OSAR Lowest predicted no-effect marine concentration (2024)

[c] The predicted chronic value is dereived from the Norman Ecotoxicology Database. The PNEC is not a robust toxicological value and is often excessively conservatitive in comparison to experimantal chronic toxcitiy values. The PNEC is only used in the absence of more robust toxicological values, and provides a reference for analytes require more consideration of potential risk.

[d] The adjusted chronic value represents criteria derived from experimental acute endpoints by the application of and uncertainty factor. The selection of adjusted chronic values is found in Table C-9_Research Based BMs.

[e] Tmetals criteria that are based on dissolved concentrations were converted to total concentrations using formulas from NRWQC (EPA 2024) and are indicated by "(total)" in the Endpoint column.

[f] The Marine Chronic National Reccomended Water Quality criteria for ammonia is pH, salinity, and temerature dependent. Chronic Value determined using pH 7.0, a salinity of 10g/kg, and a temperature of 10°C.

-- - not available

BM = benchmark

CCC = criterion continuous concentration

NRWQC =National Recommended Water Quality Criteria

Table C-8. Supporting Literature for Derived Toxicity Benchmarks for Prey Fish

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS No	Fish BM Surrogate	Test Species	Measured Effect	Test Duration	Exposure Media	Endpoint	Effect Level (ug/L)	UF	No Effect Benchmark (ug/L)	Source
Anabolic agent	Androstenedione	63-05-8	--	Western mosquitofish	MOR	4	FW	LC50	10500	10	1050	Hunsinger, R.N. and Howell, 1991
Analgesic	Ibuprofen	15687-27-1	--	Medaka	MOR	122	FW	NOEC	680	1	680	Overturf et al., 2012
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	51146-55-5	Ibuprofen	--	--	--	--	--	--	--	680	*See Surrogate
Anti-acid reflux	Ranitidine	66357-35-5	--	Rotifer	MOR	1	FW	LC50	100000	10	10000	Isidori et al., 2005
Antiasthmatic	Albuterol	18559-94-9	--	Daphnia	REP	8	FW	NOEC	100	1	100	AstraZeneca, 2023
Antiasthmatic	Theophylline	58-55-9	--	Zebra Danio	GRO	3	FW	EC50	96389	10	9638.9	Pruvot et al., 2012
Antibacterial	Penicillin V	87-08-1	Penicillin	Sea Urchin	MOR	3	SW	NOEC	10000	10	1000	Carballeira et al., 2012
Antibiotic	4-Epitetracycline [ETC]	23313-80-6	tetracycline	Lake Trout	MOR	4	FW	LC50	220000	10	22000	Marking et al., 1989
Antibiotic	Enrofloxacin	93106-60-6	--	Fathead Minnow	MOR	7	FW	NOEC	10000	1	10000	Robinson et al., 2005
Anticonvulsant	Carbamazepine	298-46-4	--	Zebra danio	MOR	10	FW	NOEC	25000	1	25000	Ferraro et al. 1977
Antidepressant	10-hydroxy-amitriptyline	1159-82-6	Amitriptyline	Zebra Danio	MOR	5	FW	LC50	10	10	1	Yang et al., 2014
Antidepressant	Amitriptyline	50-48-6	--	Mussel	DEV	3	SW	LOEC	277.4	10	27.74	Yang et al., 2014
Antidiabetic drug	Glipizide	29094-61-9	--	Daphnia	MOR	4	FW	LC50	100000	10	10000	Cunningham et al., 2006
Antidiabetic drug	Glyburide	10238-21-8	--	Zebra Danio	MOR	5	FW	NOEL	49400	10	4940	Gustafson et al., 2012
Antidiabetic drug	Metformin	657-24-9	--	Fathead Minnow	REP	177	FW	NOEC	322	1	322	Parrot et al., 2021
Antifungal agent	Miconazole	22916-47-8	--	Rainbow Trout	GEN	3	FW	IC50	333	10	33.3	Beijer et al., 2018
Antihistamine	Diphenhydramine	58-73-1	--	Zebra Danio	MOR	6	FW	LC50	28090	10	2809	Selderslaghs et al., 2012
Antihistamine	Promethazine	60-87-7	--	Artemia	MOR	4	SW	LC50	18.1	10	1.81	Ignoto et al., 2022
Antihypertensive	Diltiazem	42399-41-7	--	Zebra Danio	MOR	6	FW	NOEC	1	10	0.1	Crago, J. and Klaper, 2018
Antihypertensive	Verapamil	52-53-9	--	Rainbow Trout	MOR	21	FW	NOEC	26.18	1	26.18	Li et al., 2011
Antilipemic	Gemfibrozil	25812-30-0	--	Fathead Minnow	REP	21	FW	NOEC	1558	1	1558	Skolness et al., 2012
Antimicrobial, disinfectant	Triclocarban	101-20-2	--	Bluegill	MOR	4	FW	LOEC	0.46	10	0.046	E.G and G. Bionomics, 1992
Antimicrobial, disinfectant	Triclosan	3380-34-5	--	Rainbow Trout	MOR	35	FW	NOEC	15.1	1	15.1	Orvos et al., 2002
Antipyretic, analgesic	Acetaminophen	103-90-2	--	Fathead Minnow	MOR	4	FW	LC50	814000	10	81400	Broderius et al., 1995
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	611-59-6	Caffine	Fathead Minnow	GRO	5	FW	LOEC	20000	10	2000	DeYoung et al., 1996
Betablocker	Atenolol	29122-68-7	--	Zebra Danio	MPH	1	FW	NOEC	7500	10	750	Zhang, X. and Gong, 2013
Betablocker	Metoprolol	51384-51-1	--	Medaka	MOR	2	FW	LC50	10000	10	10000	Hugget et al., 2002
Betablocker	Propranolol	525-66-6	--	Fathead Minnow	MOR	21	FW	NOEC	4.11	1	4.11	Lorenzi et al., 2012
BloodThinner	Warfarin	81-81-2	--	Rasbora	MOR	2	FW	LC50	14000	10	1400	Tooby et al., 1975
ChannelBlocker	Amlodipine	88150-42-9	--	Hydra	MOR	7	FW	NR-Zero	1000	10	100	Pascoa et al., 2003
ChannelBlocker	Desmethyldiltiazem	42399-41-7	--	Zebra Danio	MOR	6	FW	NOEC	1	10	0.1	Crago, J. and Klaper, 2018
ChannelBlocker	Norverapamil	67018-85-3	--	Rainbow Trout	MOR	4	FW	LC50	2700	10	270	Li et al., 2010
Cocaine metabolite	Benzoylecgonine	519-09-5	Cocaine	--	--	--	--	--	--	--	62.5	*See Surrogate
Depressant	Diazepam	439-14-5	--	Zebra Danio	GRO	14	FW	NOEC	291	1	291	Oggier et al., 2010
Diuretic	Triamterene	396-01-0	--	Rainbow Trout	MOR	4	SW	LC50	13000	10	1300	Moehs, 2016
Flame Retardant	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-209)	1163-19-5	--	Zebra Danio	MOR	34	FW	NOEC	30	1	30	Han et al. 2017
Flame Retardant	2,2',3,3',4,4',5,6,6'-NoBDE	32534-81-9	--	Medaka	MOR	2	FW	LC50	500000	10	50000	Great Lakes Chem Corp, 2000
Flame Retardant	2,2',3,4,4',5,5',6-OcBDE	337513-72-1	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,2',3,4,4',5',6-HpBDE	207122-16-5	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,2',3,4,4',5'-HxBDE	182677-30-1	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,2',3,4,4',6'-HxBDE	243982-83-4	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,2',3,4,4'-PeBDE	182346-21-0	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,2',4,4',5,5'-HxBDE	68631-49-2	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,2',4,4',5,6'-HxBDE	207122-15-4	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,2',4,4',5-PeBDE (BDE-99)	60348-60-9	--	Turbot	MOR	6	SW	LC50	38.28	10	3.828	Mhadhabi et al. 2012
Flame Retardant	2,2',4,4',6,6'-HxBDE	35854-94-5	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,2',4,4',6-PeBDE	189084-64-8	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,2',4,4'-TeBDE (BDE-47)	5436-43-1	--	Turbot	MOR	6	SW	LC50	27.35	10	2.735	Mhadhabi et al. 2012
Flame Retardant	2,2',4,5'-TeBDE	243982-82-3	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,2',4,6'-TeBDE	189084-57-9	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,2',4-TriBDE	147217-75-2	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,3',4,4',6-PeBDE	189084-66-0	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,3',4,4'-TeBDE	189084-61-5	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,3',4',6-TeBDE	189084-62-6	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Flame Retardant	2,4,4'-TriBDE	41318-75-6	BDE-47	--	--	--	--	--	--	--	2.735	*See Surrogate
Fungicide and parasiticide	Thiabendazole	148-79-8	--	Sheepshead minnow	MOR	4	SW	NOEL	3600	10	360	EPA, 1992
Glycoside	Digoxin	20830-75-5	--	Brine Shrimp	MOR	1	SW	LC50	9996170	10	999617	Calleja, M.C. and Personne, 1992
Lincosamide antibiotic	Lincomycin	154-21-2	--	Zebra Danio	MOR	4	FW	NOEC	1000000	10	100000	Isidori et al., 2005
Macrolide antibiotic	Azithromycin	83905-01-5	--	Water flea	NA	NA	FW	EC50	120000	10	12000	Webb, S.F., 2001
Macrolide antibiotic	Clarithromycin	81103-11-9	--	Medaka	MOR	4	FW	LC50	100000	10	10000	Kim et al., 2009
Macrolide antibiotic	Erythromycin-H2O	114-07-8	--	Striped bass	MOR	4	FW	LC50	349000	10	34900	Bills et al., 1993
Metals	Dissolved Molybdenum	7439-98-7	Molybdenum	--	--	--	--	--	--	--	73	*See Surrogate
Metals	Molybdenum	7439-98-7	--	Rainbow Trout	MOR	28	FW	LC50	730	10	73	Birge et al., 1979
Non-steroidalanti-inflammatory drug	Naproxen	22204-53-1	--	Zebra Danio	MOR	4	FW	NOEC	10000	10	1000	Bereketoglu et al., 2020
Pesticides	2,4'-DDD	53-19-0	--	Rainbow Trout	MOR	4	FW	LC50	0.07	10	0.007	Mayer et al., 1986

Table C-8. Supporting Literature for Derived Toxicity Benchmarks for Prey Fish

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS No	Fish BM Surrogate	Test Species	Measured Effect	Test Duration	Exposure Media	Endpoint	Effect Level (ug/L)	UF	No Effect Benchmark (ug/L)	Source
Pesticides	4,4'-DDT	50-29-3	--	Dwarf Perch	MOR	4	SW	LC50	0.26	10	0.026	Earnestm R.D. and Benville, 1972
Pesticides	Chlordane, alpha (cis)	5103-71-9	--	Bluegill	MOR	4	FW	LC50	7.09	10	0.709	Mayer et al., 1986
Pesticides	Chlorpyriphos	2921-88-2	--	Silverside	MOR	4	SW	LC50	0.4	10	0.04	Borthwick et al., 1985
Pesticides	Chlorpyriphos-Methyl	5598-13-0	--	Spot	MOR	1	SW	EC50	0.15	10	0.015	Hansen, D.J., 1980
Pesticides	Cypermethrin	52315-07-8	--	Sheepshead minnow	MOR	4	SW	NOEL	0.48	10	0.048	EPA, 1992
Pesticides	DEET	134-62-3	--	Rainbow Trout	MOR	4	FW	NOEC	56000	10	5600	EPA, 1992
Pesticides	Permethrin	52645-53-1	--	Silverside	MOR	4	SW	LC50	2.2	10	0.22	Schimmel et al., 1983
PFAS	5:3 FTCA	914637-49-3	--	Zebra Danio	MOR	5	FW	NOEC	249.7	10	24.97	Rericha et al., 2021
PFAS	PFBA	375-22-4	--	--	--	--	--	--	--	--	11	Valsecchi et al., 2017
PFAS	PFHpA	375-85-9	--	Zebra Danio	MOR	5	FW	NOEC	23300	10	2330	Truong et al., 2014
PFAS	PFHxA	307-24-4	--	--	--	--	--	--	--	--	544	Argonne, 2024
PFAS	PFHxS	355-46-4	--	--	--	--	--	--	--	--	14.1	Argonne, 2024
PFAS	PFNA	375-95-1	--	--	--	--	--	--	--	--	0.116	Argonne, 2024
PFAS	PFOA	335-67-1	--	--	--	--	--	--	--	--	3.16	Argonne, 2024
PFAS	PFOS	1763-23-1	--	--	--	--	--	--	--	--	0.0167	Argonne, 2024
PFAS	PFPeA	2706-90-3	--	--	--	--	--	--	--	--	3.2	Valsecchi et al., 2017
PFAS	PFPeS	175905-36-9	PFPeA	--	--	--	--	--	--	--	3.2	*See Surrogate
Plasticizer	Bisphenol A	80-05-7	--	Yellowfin Goby	Biochemical	21	SW	LOEC	1.75	1	1.75	Lahnsteiner et al., 2005
Plasticizer	Bisphenol S	80-09-1	--	Zebra Danio	MOR	1	FW	LC50	328700	10	32870	Ji et al., 2022
Pyrimidine antibiotic	Trimethoprim	738-70-5	--	Zebra danio	MPH	21	FW	NOEC	157	1	157	Madureira et al., 2011
Quinoline antibiotic	Ciprofloxacin	85721-33-1	--	Zebra danio	MOR	4	FW	NOEC	100000	10	10000	Shahnaz et al., 2021
Quinoline antibiotic	Ofloxacin	82419-36-1	--	Fathead Minnow	GRO/MOR	7	FW	NOEC	10000	1	10000	Robinson et al., 2005
Rubber Stabilizing compound	6PPD-Quinone	2754428-18-5	--	Chinook Salmon	MOR	1	SW	LC50	67.31	10	6.731	Lo et al., 2023
Sex hormone	17 beta-Estradiol	50-28-2	--	Sand Goby	MOR	245	SW	NOEC	0.097	1	0.097	Robinson et al. 2007
Sex hormone	Estrone	53-16-7	--	Ricefish	MOR	18	SW	NOEC	3.701	1	3.701	Imai et al., 2007
Sex hormone	Progesterone	57-83-0	--	Mosquitofish	MOR	8	FW	NR-Zero	0.93	1	0.93	Huang et al., 2013
Sex hormone	Testosterone	58-22-0	--	Sheepshead Minnow	MOR	7	SW	NR-Zero	5	1	5	Hemmer et al., 2011
SSRI Antidepressant	Fluoxetine	54910-89-3	--	Medaka	MOR	28	SW	NOEC	5	1	5	Foran et al., 2004
SSRI Antidepressant	Norfluoxetine	83891-03-6	--	Zebra Danio	MPH	9	FW	LOEC	0.109	1	0.109	Chai et al., 2021
SSRI Antidepressant	Paroxetine	61869-08-7	--	Daphnia	MOR	2	FW	LC50	580	10	58	Henry et al., 2004
SSRI Antidepressant	Sertraline	79617-96-2	--	Fathead Minnow	MOR	4	FW	NOEC	143	10	14.3	Johnson, D.J., 2004
Statin	Atorvastatin	134523-00-5	--	Amphipod	GRO	14	FW	EC50	2400	1	2400	Dussault et al., 2008
Steroid	Prednisolone	50-24-8	--	Rotifer	MOR	1	FW	LC50	22290	10	2229	DellaGreca et al., 2004
Stimulant	Caffeine	58-08-2	--	Fathead Minnow	GRO	5	FW	LOEC	20000	10	2000	DeYoung et al., 1996
Stimulant	Cocaine	50-36-2	--	Mussel	DEV	2	SW	NOEC	625	10	62.5	Maranho et al., 2017
Streoid	Prednisone	53-03-2	Prednisolone	--	--	--	--	--	--	--	2229	*See Surrogate
Sulfonamide antibiotic	Sulfadiazine	68-35-9	--	Carp, hawk fish	GRO	10	FW	NA	200000	1	200000	Ramaiah et al., 1989
Sulfonamide antibiotic	Sulfamethoxazole	723-46-6	--	Zebra Danio	REP	21	FW	NOEC	533	1	533	Madureira et al., 2011
SVOCs/PAHs	Benzo(b)fluorene	243-17-4	--	Daphnia	MOR	2	FW	EC50	10	10	1	Lampi et al., 2005
SVOCs/PAHs	Naphthobenzothiophene	205-43-6	--	Daphnia	MOR	2	FW	LC50	220	10	22	Eastmond et al., 1984
SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	--	Mummichog	MOR	1	SW	LC50	8300000	10	830000	Ferraro et al. 1977
SVOCs/PAHs	Retene	483-65-8	--	Rainbow Trout	MOR	42	FW	NOEC	100	1	100	Billiard et al., 1990
Tetracycline antibiotic	Doxycycline	564-25-0	--	Zebra Danio	MPH	10	FW	LOEC	20000	10	2000	Zhu et al., 2021
Tetracycline antibiotic	Tetracycline [TC]	60-54-8	oxytetracycline	Medaka	MOR	4	FW	LC50	110100	10	11010	Park, S. and Choi, 2008
Urinary steroid	Androsterone	53-41-8	--	Common eel	MPH	28	FW	NA	50	1	50	Peyon et al., 1997
VOCs	Chloroethane	75-00-3	--	Silverside	MOR	4	SW	LC50	270000	10	27000	Dawson et al., 1977
VOCs	Chloromethane	74-87-3	--	Silverside	MOR	4	SW	LC50	270000	10	27000	Dawson et al., 1977

Notes:

-- = not available

EC50 = effects concentration where 50% of test population exhibits the effect

FW = freshwater

GRO = Growth

IC50 = concentration to inhibit biological process by 50%

LC50 = lethal concentration to 50% of the test population

LOEC = lowest observed effect concentration

MOR = mortality

MPH = morphology

NA = not available

NOEC =no observed effect conccentration

NOEL = no observed effect level

NR-Zero = endpoint not reported but zero mortality

SW = saltwater

UF = uncertainty factor

Table C-9. Preliminary Screening - Prey Fish
AWWU Ecological Risk Evaluation

Chemical Group	Analyte	CAS	Maximum Detect (ug/L)	BM (ug/L)	HQ End of Pipe	Retain for Refined Assessment
Metals	Antimony	7440-36-0	0.90	4300	2.1E-04	No
Metals	Arsenic	7440-38-2	3.42	36	9.5E-02	No
Metals	Beryllium	7440-41-7	0.02	0.13	1.4E-01	No
Metals	Cadmium	7440-43-9	0.31	7.9	3.9E-02	No
Metals	Chromium	7440-47-3	3.46	50.4	6.9E-02	No
Metals	Copper	7440-50-8	115	3.7	3.1E+01	**Yes**
Metals	Dissolved Antimony	7440-36-0	0.81	4300	1.9E-04	No
Metals	Dissolved Arsenic	7440-38-2	2.78	36	7.7E-02	No
Metals	Dissolved Beryllium	7440-41-7	0.00	0.13	3.1E-02	No
Metals	Dissolved Cadmium	7440-43-9	0.21	7.9	2.7E-02	No
Metals	Dissolved Chromium	7440-47-3	3.63	50	7.3E-02	No
Metals	Dissolved Copper	7440-50-8	41.80	3.1	1.3E+01	**Yes**
Metals	Dissolved Lead	7439-92-1	1.54	8.1	1.9E-01	No
Metals	Dissolved Mercury	7439-97-6	0.09	0.025	3.6E+00	**Yes**
Metals	Dissolved Molybdenum	7439-98-7	47.60	73	6.5E-01	No
Metals	Dissolved Nickel	7440-02-0	9.49	8.2	1.2E+00	**Yes**
Metals	Dissolved Selenium	7782-49-2	1.00	71.0	1.4E-02	No
Metals	Dissolved Silver	7440-22-4	0.42	0.2	2.2E+00	**Yes**
Metals	Dissolved Thallium	7440-28-0	0.03	6.3	5.1E-03	No
Metals	Dissolved Zinc	7440-66-6	124.00	81	1.5E+00	**Yes**
Metals	Lead	7439-92-1	4.80	8.52	5.6E-01	No
Metals	Mercury	7439-97-6	0.11	0.03	3.8E+00	**Yes**
Metals	Molybdenum	7439-98-7	48.70	73	6.7E-01	No
Metals	Nickel	7440-02-0	6.70	8.28	8.1E-01	No
Metals	Selenium	7782-49-2	1.20	71.14	1.7E-02	No
Metals	Silver	7440-22-4	0.49	0.22	2.2E+00	**Yes**
Metals	Thallium	7440-28-0	0.05	6.3	8.3E-03	No
Metals	Zinc	7440-66-6	165.00	85.6	1.9E+00	**Yes**
Ammonia	Total Ammonia	7664-41-7	33000.00	16500	2.0E+00	**Yes**
Cyanide	Cyanide, Total	57-12-5	9.00	1	9.0E+00	**Yes**
ACE inhibitor	Enalapril	75847-73-3	0.01	0.16	7.6E-02	No
Anabolic agent	Androstenedione	63-05-8	0.16	1050	1.5E-04	No
Analgesic	Ibuprofen	15687-27-1	20.90	680	3.1E-02	No
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	51146-55-5	38.70	680	5.7E-02	No
Anti-acid reflux	Ranitidine	66357-35-5	0.08	10000	8.4E-06	No
Antiasthmatic	Albuterol	18559-94-9	0.02	100	2.0E-04	No
Antiasthmatic	Theophylline	58-55-9	51.10	9638.9	5.3E-03	No
Antibacterial	Penicillin V	87-08-1	0.01	1000	1.3E-05	No
Antibiotic	4-Epitetracycline [ETC]	23313-80-6	0.07	22000	3.0E-06	No
Antibiotic	Enrofloxacin	93106-60-6	0.00	10000	7.1E-08	No
Anticonvulsant	Benztropine	86-13-5	0.00	0.027	3.9E-02	No
Anticonvulsant	Carbamazepine	298-46-4	0.51	25000	2.0E-05	No
Antidepressant	10-hydroxy-amitriptyline	1159-82-6	0.02	1	1.9E-02	No
Antidepressant	Amitriptyline	50-48-6	0.07	27.74	2.7E-03	No
Antidiabetic drug	Glipizide	29094-61-9	0.01	10000	1.1E-06	No

Table C-9. Preliminary Screening - Prey Fish

AWWU Ecological Risk Evaluation

Chemical Group	Analyte	CAS	Maximum Detect (ug/L)	BM (ug/L)	HQ End of Pipe	Retain for Refined Assessment
Antidiabetic drug	Glyburide	10238-21-8	0.02	4940	3.7E-06	No
Antidiabetic drug	Metformin	657-24-9	89.30	322	2.8E-01	No
Antifungal agent	Miconazole	22916-47-8	0.06	33.3	1.7E-03	No
Antihistamine	Diphenhydramine	58-73-1	1.68	2809	6.0E-04	No
Antihistamine	Promethazine	60-87-7	0.03	1.81	1.9E-02	No
Antihypertensive	Diltiazem	42399-41-7	0.41	0.1	4.1E+00	**Yes**
Antihypertensive	Valsartan	137862-53-4	15.80	56	2.8E-01	No
Antihypertensive	Verapamil	52-53-9	0.05	26.18	2.0E-03	No
Antilipemic	Gemfibrozil	25812-30-0	1.33	1558	8.5E-04	No
Antimicrobial, disinfectant	Triclocarban	101-20-2	0.00	0.046	1.1E-01	No
Antimicrobial, disinfectant	Triclosan	3380-34-5	4.31	15.1	2.9E-01	No
Antipyretic, analgesic	Acetaminophen	103-90-2	122.00	81400	1.5E-03	No
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	611-59-6	57.80	2000	2.9E-02	No
Betablocker	Atenolol	29122-68-7	1.88	750	2.5E-03	No
Betablocker	Metoprolol	51384-51-1	0.49	10000	4.9E-05	No
Betablocker	Propranolol	525-66-6	0.07	4.11	1.8E-02	No
BloodThinner	Warfarin	81-81-2	0.00	1400	2.9E-06	No
ChannelBlocker	Amlodipine	88150-42-9	0.02	100	2.5E-04	No
ChannelBlocker	Dehydronifedipine	67035-22-7	0.00	0.0021	6.7E-01	No
ChannelBlocker	Desmethyldiltiazem	42399-41-7	0.08	0.1	8.4E-01	No
ChannelBlocker	Norverapamil	67018-85-3	0.02	270	7.0E-05	No
Cocaine metabolite	Benzoylecgonine	519-09-5	1.96	62.5	3.1E-02	No
Contraceptive	Norgestrel	6533-00-2	0.08	0.59	1.4E-01	No
Corticosteroid	Hydrocortisone	50-23-7	0.78	28.8	2.7E-02	No
Depressant	Alprazolam	28981-97-7	0.00	0.0077	4.2E-01	No
Depressant	Diazepam	439-14-5	0.00	291	2.8E-06	No
Diuretic	Furosemide	54-31-9	0.21	3.13	6.6E-02	No
Diuretic	Hydrochlorothiazide	58-93-5	1.07	10	1.1E-01	No
Diuretic	Triamterene	396-01-0	0.09	1300	7.2E-05	No
Fungicide and parasiticide	Thiabendazole	148-79-8	0.03	360	8.5E-05	No
Glycoside	Digoxin	20830-75-5	0.07	999617	7.0E-08	No
Lincosamide antibiotic	Lincomycin	154-21-2	0.04	100000	4.4E-07	No
Macrolide antibiotic	Azithromycin	83905-01-5	0.34	12000	2.8E-05	No
Macrolide antibiotic	Clarithromycin	81103-11-9	0.17	10000	1.7E-05	No
Macrolide antibiotic	Erythromycin-H2O	114-07-8	0.17	34900	4.8E-06	No
Macrolide antibiotic	Roxithromycin	80214-83-1	0.00	0.1	9.4E-03	No
Macrolide antibiotic	Tylosin	1401-69-0	0.00	0.4	3.6E-03	No
Nicotinemetabolite	Cotinine	486-56-6	2.80	55.3	5.1E-02	No
Non-steroidalanti-inflammatory drug	Naproxen	22204-53-1	12.40	1000	1.2E-02	No
Oil & Grease	Oil and Grease, Total (HEM)	--	42700.00	--	--	Uncertainty
Opiate	Codeine	76-57-3	0.15	0.72	2.1E-01	No
Opiate	Hydrocodone	125-29-1	0.07	0.41	1.7E-01	No
Opiate	Oxycodone	76-42-6	0.16	0.8	2.0E-01	No
Opiod	Propoxyphene	469-62-5	0.01	0.045	2.3E-01	No
PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-209)	1163-19-5	0.03	30	8.6E-04	No

Table C-9. Preliminary Screening - Prey Fish

AWWU Ecological Risk Evaluation

Chemical Group	Analyte	CAS	Maximum Detect (ug/L)	BM (ug/L)	HQ End of Pipe	Retain for Refined Assessment
PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	32534-81-9	0.01	50000	1.0E-07	No
PBDEs	2,2',3,4,4',5,5',6-OcBDE	337513-72-1	0.00	2.735	5.2E-04	No
PBDEs	2,2',3,4,4',5',6-HpBDE	207122-16-5	0.00	2.735	2.5E-04	No
PBDEs	2,2',3,4,4',5'-HxBDE	182677-30-1	0.00	2.735	1.8E-04	No
PBDEs	2,2',3,4,4',6'-HxBDE	243982-83-4	0.00	2.735	5.6E-05	No
PBDEs	2,2',3,4,4'-PeBDE	182346-21-0	0.00	2.735	6.7E-04	No
PBDEs	2,2',4,4',5,5'-HxBDE	68631-49-2	0.00	2.735	1.3E-03	No
PBDEs	2,2',4,4',5,6'-HxBDE	207122-15-4	0.00	2.735	1.1E-03	No
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	60348-60-9	0.04	3.828	1.1E-02	No
PBDEs	2,2',4,4',6,6'-HxBDE	35854-94-5	0.00	2.735	7.8E-05	No
PBDEs	2,2',4,4',6-PeBDE	189084-64-8	0.01	2.735	3.0E-03	No
PBDEs	2,2',4,4'-TeBDE (BDE-47)	5436-43-1	0.04	2.735	1.6E-02	No
PBDEs	2,2',4,5'-TeBDE	243982-82-3	0.00	2.735	5.7E-04	No
PBDEs	2,2',4,6'-TeBDE	189084-57-9	0.00	2.735	8.8E-05	No
PBDEs	2,2',4-TriBDE	147217-75-2	0.00	2.735	4.1E-04	No
PBDEs	2,3',4,4',6-PeBDE	189084-66-0	0.00	2.735	7.4E-05	No
PBDEs	2,3',4,4'-TeBDE	189084-61-5	0.00	2.735	5.5E-04	No
PBDEs	2,3',4',6-TeBDE	189084-62-6	0.00	2.735	2.0E-04	No
PBDEs	2,4,4'-TriBDE	41318-75-6	0.00	2.735	4.9E-04	No
Pesticides	2,4'-DDD	53-19-0	0.00	0.007	1.5E-01	No
Pesticides	4,4'-DDD	72-54-8	0.02	0.084	2.5E-01	No
Pesticides	4,4'-DDE	72-55-9	0.00	0.14	3.4E-02	No
Pesticides	4,4'-DDT	50-29-3	0.00	0.001	1.9E-01	No
Pesticides	Aldrin	309-00-2	0.01	0.0001	9.7E+01	**Yes**
Pesticides	Chlordane, alpha (cis)	5103-71-9	0.00	0.709	2.0E-04	No
Pesticides	Chlorpyriphos	2921-88-2	0.00	0.04	2.4E-02	No
Pesticides	Chlorpyriphos-Methyl	5598-13-0	0.00	0.015	1.4E-02	No
Pesticides	Cypermethrin	52315-07-8	0.00	0.048	8.4E-02	No
Pesticides	DEET	134-62-3	6.36	5600	1.1E-03	No
Pesticides	Demeton-O,S	126-75-0	0.04	0.1	3.8E-01	No
Pesticides	Dieldrin	60-57-1	0.01	0.0019	7.4E+00	**Yes**
Pesticides	Endosulfan Sulfate	1031-07-8	0.02	0.0087	2.5E+00	**Yes**
Pesticides	Endrin	72-20-8	0.00	0.0023	2.7E-02	No
Pesticides	Endrin Ketone	53494-70-5	0.01	0.0023	4.2E+00	**Yes**
Pesticides	HCH, alpha	319-84-6	0.00	0.046	1.4E-03	No
Pesticides	HCH, beta	319-85-7	0.00	0.046	2.4E-03	No
Pesticides	HCH, gamma	58-89-9	0.00	0.02	3.5E-02	No
Pesticides	Heptachlor	76-44-8	0.01	0.0036	3.9E+00	**Yes**
Pesticides	Hexachlorobenzene	118-74-1	0.00	0.15	3.4E-03	No
Pesticides	Malathion	121-75-5	0.52	0.1	5.2E+00	**Yes**
Pesticides	Methoxychlor	72-43-5	0.00	0.03	9.7E-02	No
Pesticides	Permethrin	52645-53-1	0.04	0.22	1.9E-01	No
PFAS	5:3 FTCA	1799325-94-2	0.06	24.97	2.4E-03	No
PFAS	PFBA	375-22-4	0.01	11	1.4E-03	No
PFAS	PFHpA	375-85-9	0.01	2330	3.6E-06	No

Table C-9. Preliminary Screening - Prey Fish
AWWU Ecological Risk Evaluation

Chemical Group	Analyte	CAS	Maximum Detect (ug/L)	BM (ug/L)	HQ End of Pipe	Retain for Refined Assessment
PFAS	PFHxA	307-24-4	0.03	544	4.7E-05	No
PFAS	PFHxS	355-46-4	0.04	14.1	2.8E-03	No
PFAS	PFNA	375-95-1	0.01	0.116	4.4E-02	No
PFAS	PFOA	335-67-1	0.02	3.16	5.9E-03	No
PFAS	PFOS	1763-23-1	0.07	0.0167	3.9E+00	**Yes**
PFAS	PFPeA	2706-90-3	0.02	3.2	6.3E-03	No
PFAS	PFPeS	175905-36-9	0.00	3.2	1.2E-03	No
Plasticizer	Bisphenol A	80-05-7	1.59	1.75	9.1E-01	No
Plasticizer	Bisphenol S	80-09-1	0.89	32870	2.7E-05	No
Pyrimidine antibiotic	Trimethoprim	738-70-5	0.71	157	4.5E-03	No
Quinoline antibiotic	Ciprofloxacin	85721-33-1	0.37	10000	3.7E-05	No
Quinoline antibiotic	Ofloxacin	82419-36-1	0.43	10000	4.3E-05	No
Rubber Stabilizing compound	6PPD-Quinone	2754428-18-5	0.01	6.731	7.9E-04	No
Sex hormone	17 beta-Estradiol	50-28-2	0.01	0.097	5.7E-02	No
Sex hormone	Estrone	53-16-7	0.03	3.701	8.9E-03	No
Sex hormone	Progesterone	57-83-0	0.06	0.93	6.1E-02	No
Sex hormone	Testosterone	58-22-0	0.07	5	1.4E-02	No
SSRI Antidepressant	Fluoxetine	54910-89-3	0.05	5	1.0E-02	No
SSRI Antidepressant	Norfluoxetine	83891-03-6	0.03	0.109	2.5E-01	No
SSRI Antidepressant	Paroxetine	61869-08-7	0.02	58	3.2E-04	No
SSRI Antidepressant	Sertraline	79617-96-2	0.11	14.3	7.6E-03	No
Statin	Atorvastatin	134523-00-5	0.22	2400	9.2E-05	No
Steroid	Methylprednisolone	83-43-2	0.11	1.74	6.5E-02	No
Steroid	Prednisolone	50-24-8	0.01	2229	4.2E-06	No
Steroidal Estrogen	Equilenin	517-09-9	0.01	0.053	2.5E-01	No
Stimulant	Amphetamine	300-62-9	0.54	2.48	2.2E-01	No
Stimulant	Caffeine	58-08-2	105.00	2000	5.3E-02	No
Stimulant	Cocaine	50-36-2	0.77	62.5	1.2E-02	No
Streoid	Prednisone	53-03-2	0.40	2229	1.8E-04	No
Sulfonamide antibiotic	Sulfadiazine	68-35-9	0.00	200000	7.3E-09	No
Sulfonamide antibiotic	Sulfamethizole	144-82-1	0.01	0.15	3.4E-02	No
Sulfonamide antibiotic	Sulfamethoxazole	723-46-6	1.08	533	2.0E-03	No
Sulfonamide antibiotic	Sulfanilamide	63-74-1	0.03	1.75	2.0E-02	No
SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	2.50	30	8.3E-02	No
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7	0.10	10	1.0E-02	No
SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4	0.05	16	3.1E-03	No
SVOCs/PAHs	1-Methylfluorene	1730-37-6	0.05	14	3.6E-03	No
SVOCs/PAHs	1-Methylnaphthalene	90-12-0	0.43	52	8.2E-03	No
SVOCs/PAHs	1-Methylphenanthrene	832-69-9	0.03	7.49	3.8E-03	No
SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	1.20	6.5	1.8E-01	No
SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0	0.34	26	1.3E-02	No
SVOCs/PAHs	2-Methylanthracene	613-12-7	0.06	0.43	1.5E-01	No
SVOCs/PAHs	2-Methylfluoranthene	33543-31-6	0.02	1.1	1.6E-02	No
SVOCs/PAHs	2-Methylnaphthalene	91-57-6	0.54	52	1.0E-02	No
SVOCs/PAHs	2-Methylphenanthrene	2531-84-2	0.06	7.49	8.6E-03	No

Table C-9. Preliminary Screening - Prey Fish
AWWU Ecological Risk Evaluation

Chemical Group	Analyte	CAS	Maximum Detect (ug/L)	BM (ug/L)	HQ End of Pipe	Retain for Refined Assessment
SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6	0.02	1.3	1.5E-02	No
SVOCs/PAHs	3-Methylphenanthrene	832-71-3	0.06	7.49	7.7E-03	No
SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5	0.02	48	4.8E-04	No
SVOCs/PAHs	Acenaphthene	83-32-9	0.08	15	5.5E-03	No
SVOCs/PAHs	Acenaphthylene	208-96-8	0.01	28	4.5E-04	No
SVOCs/PAHs	Anthracene	120-12-7	0.06	0.43	1.3E-01	No
SVOCs/PAHs	Benz(a)anthracene	56-55-3	0.25	0.35	7.1E-01	No
SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2	0.02	0.06	2.5E-01	No
SVOCs/PAHs	Benzo(a)pyrene	50-32-8	0.06	0.02	2.8E+00	**Yes**
SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	0.05	0.06	8.2E-01	No
SVOCs/PAHs	Benzo(b)fluorene	243-17-4	0.04	1	4.1E-02	No
SVOCs/PAHs	Benzo(e)pyrene	192-97-2	0.05	0.9	5.8E-02	No
SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	0.08	0.012	6.9E+00	**Yes**
SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9	0.03	0.06	5.6E-01	No
SVOCs/PAHs	Benzothiophene	95-15-8	0.01	450	3.2E-05	No
SVOCs/PAHs	Biphenyl	92-52-4	0.10	49	2.1E-03	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	95.00	6	1.6E+01	**Yes**
SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	5.62	18	3.1E-01	No
SVOCs/PAHs	Carbazole	86-74-8	0.20	112	1.8E-03	No
SVOCs/PAHs	Chrysene/Triphenylene	218-01-9, 217-59-4	0.06	0.35	1.8E-01	No
SVOCs/PAHs	cis/trans Decalin	493-01-6	0.48	1.4	3.5E-01	No
SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	0.01	0.01	6.7E-01	No
SVOCs/PAHs	Dibenzofuran	132-64-9	0.07	61	1.1E-03	No
SVOCs/PAHs	Dibenzothiophene	132-65-0	0.03	48	7.0E-04	No
SVOCs/PAHs	Diethyl Phthalate	84-66-2	3.70	59	6.3E-02	No
SVOCs/PAHs	Dimethyl Phthalate	131-11-3	0.12	3295	3.6E-05	No
SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	0.84	27	3.1E-02	No
SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	18.90	215	8.8E-02	No
SVOCs/PAHs	Fluoranthene	206-44-0	0.32	0.82	3.9E-01	No
SVOCs/PAHs	Fluorene	86-73-7	0.13	24	5.3E-03	No
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	0.04	0.012	3.7E+00	**Yes**
SVOCs/PAHs	Isophorone	78-59-1	0.38	996	3.8E-04	No
SVOCs/PAHs	Naphthalene	91-20-3	0.98	1.4	7.0E-01	No
SVOCs/PAHs	Naphthobenzothiophene	205-43-6	0.03	22	1.5E-03	No
SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	9.60	830000	1.2E-05	No
SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	6.30	7.9	8.0E-01	No
SVOCs/PAHs	Perylene	198-55-0	0.03	0.9	3.7E-02	No
SVOCs/PAHs	Phenanthrene	85-01-8	0.98	4.6	2.1E-01	No
SVOCs/PAHs	Phenol	108-95-2	54.50	58	9.4E-01	No
SVOCs/PAHs	Pyrene	129-00-0	0.47	0.11	4.3E+00	**Yes**
SVOCs/PAHs	Retene	483-65-8	0.01	100	1.1E-04	No
Tetracycline antibiotic	Doxycycline	564-25-0	0.15	2000	7.5E-05	No
Tetracycline antibiotic	Tetracycline [TC]	60-54-8	0.10	11010	8.9E-06	No
Tranquilizer	Meprobamate	57-53-4	0.38	2.7	1.4E-01	No
Urinary steroid	Androsterone	53-41-8	0.06	50	1.1E-03	No

Table C-9. Preliminary Screening - Prey Fish
AWWU Ecological Risk Evaluation

Chemical Group	Analyte	CAS	Maximum Detect (ug/L)	BM (ug/L)	HQ End of Pipe	Retain for Refined Assessment
VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	0.79	2097	3.8E-04	No
VOCs	1,2-Dichloroethane (EDC)	107-06-2	0.08	5650	1.4E-05	No
VOCs	1,4-Dichlorobenzene	106-46-7	0.84	115	7.3E-03	No
VOCs	2-Butanone (MEK)	78-93-3	68.00	65695	1.0E-03	No
VOCs	2-Hexanone	591-78-6	5.70	16871	3.4E-04	No
VOCs	Acetone	67-64-1	300.00	117629	2.6E-03	No
VOCs	Acrolein	107-02-8	1.30	1.8	7.2E-01	No
VOCs	Benzene	71-43-2	0.78	110	7.1E-03	No
VOCs	Bromodichloromethane	75-27-4	0.08	3510	2.3E-05	No
VOCs	Bromomethane	74-83-9	0.09	265	3.4E-04	No
VOCs	Carbon Disulfide	75-15-0	0.70	253	2.8E-03	No
VOCs	Chlorobenzene	108-90-7	0.08	25	3.2E-03	No
VOCs	Chloroethane	75-00-3	0.69	27000	2.6E-05	No
VOCs	Chloroform	67-66-3	3.95	471	8.4E-03	No
VOCs	Chloromethane	74-87-3	1.90	27000	7.0E-05	No
VOCs	cis-1,2-Dichloroethene	156-59-2	0.07	3.2	2.2E-02	No
VOCs	Dichloromethane (Methylene Chloride)	75-09-2	6.85	1580	4.3E-03	No
VOCs	Ethylbenzene	100-41-4	1.50	25	6.0E-02	No
VOCs	m,p-Xylenes	179601-23-1	6.20	260	2.4E-02	No
VOCs	o-Xylene	95-47-6	2.60	260	1.0E-02	No
VOCs	Styrene	100-42-5	5.50	412	1.3E-02	No
VOCs	Tetrachloroethene (PCE)	127-18-4	0.60	8.85	6.8E-02	No
VOCs	Toluene	108-88-3	16.00	215	7.4E-02	No
VOCs	Trichloroethene (TCE)	79-01-6	0.07	81	8.6E-04	No
VOCs	Vinyl Chloride	75-01-4	0.02	22760	8.8E-07	No

Notes:
-- - not applicable, not available
BM = benchmark
EPC = exposure point concentration
HQ = hazard quotient
Bold = hazard quotient exceeds 1

Table C-10. Preliminary Screening Summary - Prey Fish

AWWU Ecological Risk Evaluation

Chemical Group	Retain for Refined Assessment
Metals	Copper
Metals	Dissolved Copper
Metals	Dissolved Mercury
Metals	Dissolved Nickel
Metals	Dissolved Silver
Metals	Dissolved Zinc
Metals	Mercury
Metals	Silver
Metals	Zinc
Ammonia	Total Ammonia
Cyanide	Cyanide, Total
Antihypertensive	Diltiazem
Pesticides	Aldrin
Pesticides	Dieldrin
Pesticides	Endosulfan Sulfate
Pesticides	Endrin Ketone
Pesticides	Heptachlor
Pesticides	Malathion
PFAS	PFOS
SVOCs/PAHs	Benzo(a)pyrene
SVOCs/PAHs	Benzo(g,h,i)perylene
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene
SVOCs/PAHs	Pyrene

Table C-11. Refined Risk Estimation - Prey Fish

AWWU Ecological Risk Evaluation

Chemical Group	Analyte	CAS	BM (ug/L)	Refined Risk Estimation								
				Edge of ZID		Knik Arm		Mid Upper Cook Inlet		Turnagain Arm		Refined Assessment - Potential For Risk
				Modeled EPC at Edge of ZID (DF=109)	Edge of ZID HQ	Modeled EPC at Knik Arm (DF=1223)	Knik ArmHQ	Modeled EPC at Mid Upper Cook Inlet (DF=2189)	Mid Upper Cook Inlet HQ	Modeled EPC In Turnagain Arm (DF=9385)	Turnagain Arm HQ	
Metals	Copper	7440-50-8	3.73	3.7E-01	9.9E-02	3.3E-02	8.8E-03	1.8E-02	4.9E-03	4.3E-03	1.1E-03	No
Metals	Dissolved Copper	7440-50-8	3.1	2.0E-01	6.5E-02	1.8E-02	5.8E-03	1.0E-02	3.2E-03	2.3E-03	7.5E-04	No
Metals	Dissolved Mercury	7439-97-6	0.025	1.6E-04	6.4E-03	1.4E-05	5.7E-04	7.9E-06	3.2E-04	1.9E-06	7.4E-05	No
Metals	Dissolved Nickel	7440-02-0	8.2	3.9E-02	4.8E-03	3.5E-03	4.2E-04	1.9E-03	2.4E-04	4.5E-04	5.5E-05	No
Metals	Dissolved Silver	7440-22-4	0.19	1.2E-03	6.2E-03	1.0E-04	5.5E-04	5.8E-05	3.1E-04	1.4E-05	7.2E-05	No
Metals	Dissolved Zinc	7440-66-6	81	6.4E-01	7.9E-03	5.7E-02	7.0E-04	3.2E-02	3.9E-04	7.4E-03	9.2E-05	No
Metals	Mercury	7439-97-6	0.03	2.9E-04	9.7E-03	2.6E-05	8.6E-04	1.4E-05	4.8E-04	3.4E-06	1.1E-04	No
Metals	Silver	7440-22-4	0.22	2.3E-03	1.1E-02	2.1E-04	9.4E-04	1.2E-04	5.3E-04	2.7E-05	1.2E-04	No
Metals	Zinc	7440-66-6	85.6	9.9E-01	1.2E-02	8.8E-02	1.0E-03	4.9E-02	5.8E-04	1.2E-02	1.3E-04	No
Ammonia	Total Ammonia	7664-41-7	16500	2.4E+02	1.5E-02	2.2E+01	1.3E-03	1.2E+01	7.4E-04	2.8E+00	1.7E-04	No
Cyanide	Cyanide, Total	57-12-5	1	1.2E-02	1.2E-02	1.1E-03	1.1E-03	6.1E-04	6.1E-04	1.4E-04	1.4E-04	No
Antihypertensive	Diltiazem	42399-41-7	0.1	2.3E-03	2.3E-02	2.1E-04	2.1E-03	1.1E-04	1.1E-03	2.7E-05	2.7E-04	No
Pesticides	Aldrin	309-00-2	0.0001	3.6E-05	3.6E-01	3.2E-06	3.2E-02	1.8E-06	1.8E-02	4.2E-07	4.2E-03	No
Pesticides	Dieldrin	60-57-1	0.0019	4.8E-05	2.5E-02	4.3E-06	2.2E-03	2.4E-06	1.3E-03	5.6E-07	2.9E-04	No
Pesticides	Endosulfan Sulfate	1031-07-8	0.0087	2.0E-04	2.3E-02	1.8E-05	2.1E-03	1.0E-05	1.2E-03	2.3E-06	2.7E-04	No
Pesticides	Endrin Ketone	53494-70-5	0.0023	8.8E-05	3.8E-02	7.8E-06	3.4E-03	4.4E-06	1.9E-03	1.0E-06	4.4E-04	No
Pesticides	Heptachlor	76-44-8	0.0036	1.3E-04	3.6E-02	1.1E-05	3.2E-03	6.4E-06	1.8E-03	1.5E-06	4.1E-04	No
Pesticides	Malathion	121-75-5	0.1	9.3E-04	9.3E-03	8.3E-05	8.3E-04	4.6E-05	4.6E-04	1.1E-05	1.1E-04	No
PFAS	PFOS	1763-23-1	0.0167	4.1E-04	2.5E-02	3.7E-05	2.2E-03	2.0E-05	1.2E-03	4.8E-06	2.9E-04	No
SVOCs/PAHs	Benzo(a)pyrene	50-32-8	0.02	3.0E-04	1.5E-02	2.6E-05	1.3E-03	1.5E-05	7.4E-04	3.4E-06	1.7E-04	No
SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	0.012	3.3E-04	2.8E-02	2.9E-05	2.5E-03	1.6E-05	1.4E-03	3.8E-06	3.2E-04	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	6	2.5E-01	4.2E-02	2.3E-02	3.8E-03	1.3E-02	2.1E-03	2.9E-03	4.9E-04	No
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	0.012	1.8E-04	1.5E-02	1.6E-05	1.3E-03	9.0E-06	7.5E-04	2.1E-06	1.8E-04	No
SVOCs/PAHs	Pyrene	129-00-0	0.11	2.0E-03	1.8E-02	1.8E-04	1.6E-03	1.0E-04	9.1E-04	2.3E-05	2.1E-04	No

Notes:

-- - not applicable, not available

BM = benchmark

EPC = exposure point concentration

HQ = hazard quotient

Table C-12. Refined Risk Summary - Prey Fish

Exposure Area	Exposure Media	Analytes Posing Potential Risk	Refined HQs	Determination of Potential Impacts
ZID (350meters)	Effluent x DL	none	All HQ<1	No contaminants retained for further evaluation. Effluent is *not likely to adversely affect* prey species within the ZID.
Knik Arm	Effluent x DL	none	All HQ<1	No contaminants retained for further evaluation. Effluent is *not likely to adversely affect* prey species within the Knik Arm.
Mid-Upper Cook Inlet	Effluent x DL	none	All HQ<1	No contaminants retained for further evaluation. Effluent is *not likely to adversely affect* prey species within Mid-Upper Cook Inlet.
Turnagain Arm	Effluent x DL	none	All HQ<1	No contaminants retained for further evaluation. Effluent is *not likely to adversely affect* prey species within Turnagain Arm.
--	Effluent	Oil and Grease, Total (HEM)	Uncertainty	Uncertainty*

Notes:

*Uncertainty exists for oil and grease mixture toxicity; many combinations of mixtures may exist. Petroleum hydrocarbons, oil, and grease mixtures are evaluated as individual components of SVOCs, VOCs, and PAHs

-- - not applicable

DL = dilution factor

HQ = hazard quotient

Table C-13. Marine Mammal Food Chain Uptake Exposure Scenarios
AWWU Ecological Risk Evaluation

Exposure Model	Exposure Area	Exposure Area Size (km^2)	Effluent Dilution Factor (DF)	Exposure Concentration (EC)		Migration Factor (Months)
				Preliminary Screening	Refined Assessment	
Modeled Concentrations in Prey Fish	End of Pipe	--	1	Maximum Detect[a]	RME EPC[a]	12, 9, 6, or 3
	Edge of ZID	0.258	109	Maximum Detect[a]	RME EPC[a]	12, 9, 6, or 3
	Knik Arm	278	1,223	Maximum Detect[a]	RME EPC[a]	12, 9, 6, or 3
	Mid Upper Cook Inlet	590	2,189	Maximum Detect[a]	RME EPC[a]	12, 9, 6, or 3
	Turnagain Arm	700	9,385	Maximum Detect[a]	RME EPC[a]	12, 9, 6, or 3
Measured Concentrations in Fish Tissue	Cook Inlet	20,000	n/a	Maximum Detect[b]	RME EPC[b]	12, 9, 6, or 3

Notes:

[a] Measured and modeled effluent concentrations are presented in Table C-6.

[b] Measured fish tissue concentrations for detected analytes are presented in Table C-4.

Migration Factor (MF)- Represent the amount of time in one year the receptor would be expected to forage within the exposure area.

Table C-14 Marine Mammal Food Chain Model Exposure Factors

AWWU Ecological Risk Evaluation

Receptor	Exposure Factors						Home Range (km^2)	Area Use Factors				
	Adult Size (kg)	Daily Dietary Intake (%)	Daily Dietary Intake (kg/kgbw-d)	Trophic Level[c]	Dietary Composition	Water Intake[d]		Edge of ZID (0.258 km^2)	Knik Arm (278 km^2)	Upper Mid Cook Inlet (590 km^2)	Turnagain Arm (700 km^2)	Cook Inlet (20, 000 km^2)
Cook Inlet Beluga[a]	1428	3% = 42.85 kg/day	0.03	4.1	100% Fish	0	20,000	0.000013	0.0139	0.0295	0.0350	1
Steller Sea Lion[b]	263	8% = 21.04 kg/day	0.08	3.97	100% Fish	0	455	0.00057	0.6110	1	1	1

Notes:

[a] Variables for the Cook Inlet Beluga were compiled from NOAA 2024, SeaWorld 2024, and Quakenbush et al. 2015.

[b] Variables for the Stellar Sea Lion were compiled from NOAA 2024, Winship 2006, and Bishop 2018.

[c] Trophic levels for beluga and sea lion as reported in Trites 2019.

[d] The daily water intake for Sea Lion and Beluga was set at 0 assuming they aquire water from prey they consume.

kg = kilogram

km = kilometer

Table C-15 Bioconcentration Factors and Food Chain Multipliers

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Analyte Group	CAS No.	Log Kow		Water-Fish BCF[a] (dry weight) (L/kg)			Food Chain Multiplier		
				LogKow	Source	BCF (L/kg)	Note	Source	Trophic Level 3	Trophic Level 4	Reference
Metals	Antimony	Metals	7440-36-0	--	EPA, 2024	4	1 ww	EPA, 2024	1	1	Sample et al., 1996
Metals	Arsenic	Metals	7440-38-2	--	EPA, 2024	176	44 ww	EPA, 2024	1	1	Sample et al., 1996
Metals	Beryllium	Metals	7440-41-7	--	EPA, 2024	76	19 ww	EPA, 2002b	1	1	Sample et al., 1996
Metals	Cadmium	Metals	7440-43-9	--	EPA, 2024	152	38 ww	EPA, 2002b	1	1	Sample et al., 1996
Metals	Chromium	Metals	7440-47-3	--	EPA, 2024	64	16 ww	EPA, 2002b	1	1	Sample et al., 1996
Metals	Copper	Metals	7440-50-8	--	EPA, 2024	144	36 ww	EPA, 2024	1	1	Sample et al., 1996
Metals	Dissolved Antimony	Metals	7440-36-0	--	EPA, 2024	4	1 ww	EPA, 2002b	1	1	Sample et al., 1996
Metals	Dissolved Arsenic	Metals	7440-38-2	--	EPA, 2024	176	44 ww	EPA, 2002b	1	1	Sample et al., 1996
Metals	Dissolved Beryllium	Metals	7440-41-7	--	EPA, 2024	76	19 ww	EPA, 2002b	1	1	Sample et al., 1996
Metals	Dissolved Cadmium	Metals	7440-43-9	--	EPA, 2024	152	38 ww	EPA, 2002b	1	1	Sample et al., 1996
Metals	Dissolved Chromium	Metals	7440-47-3	--	EPA, 2024	64	16 ww	EPA, 2002b	1	1	Sample et al., 1996
Metals	Dissolved Copper	Metals	7440-50-8	--	EPA, 2024	144	36 ww	EPA, 2024	1	1	Sample et al., 1996
Metals	Dissolved Lead	Metals	7439-92-1	0.73	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Metals	Dissolved Mercury	Metals	7439-97-6	--	EPA, 2024	25036	6259 ww	EPA, 1995	2.52	12.6	Sample et al., 1996
Metals	Dissolved Molybdenum	Metals	7439-98-7	--	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Metals	Dissolved Nickel	Metals	7440-02-0	--	EPA, 2024	188	47 ww	EPA, 2002b	1	1	Sample et al., 1996
Metals	Dissolved Selenium	Metals	7782-49-2	0.24	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Metals	Dissolved Silver	Metals	7440-22-4	0.23	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Metals	Dissolved Thallium	Metals	7440-28-0	0.23	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Metals	Dissolved Zinc	Metals	7440-66-6	--	EPA, 2024	188	47 ww	EPA, 2002b	1	1	Sample et al., 1996
Metals	Lead	Metals	7439-92-1	0.73	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Metals	Mercury	Metals	7439-97-6	--	EPA, 2024	25036	6259 ww	EPA, 1995	2.52	12.6	Sample et al., 1996
Metals	Molybdenum	Metals	7439-98-7	--	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Metals	Nickel	Metals	7440-02-0	--	EPA, 2024	188	47 ww	EPA, 2002b	1	1	Sample et al., 1996
Metals	Selenium	Metals	7782-49-2	0.24	EPA, 2024	19.52	4.88 ww	EPA, 2002b	1	1	Sample et al., 1996
Metals	Silver	Metals	7440-22-4	0.23	EPA, 2024	2	0.5 ww	EPA, 2002b	1	1	Sample et al., 1996
Metals	Thallium	Metals	7440-28-0	0.23	EPA, 2024	464	116 ww	EPA, 2024	1	1	Sample et al., 1996
Metals	Zinc	Metals	7440-66-6	--	EPA, 2024	188	47 ww	EPA, 2002b	1	1	Sample et al., 1996
Ammonia	Total Ammonia	Ammonia	7664-41-7	-1.38	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Cyanide	Cyanide, Total	Cyanide	57-12-5	-0.25	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
ACE inhibitor	Enalapril	ACE inhib	75847-73-3	0.07	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Anabolic agent	Androstenedione	Anabolic	63-05-8	2.75	EPA, 2024	121.2	30.3 ww	EPA, 2024	1.028	1.007	Sample et al., 1996
Analgesic	Ibuprofen	Analgesic	15687-27-1	3.97	EPA, 2024	12.648	3.162 ww	EPA, 2024	1.253	1.072	Sample et al., 1996
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	Analgesic	51146-55-5	2.29	EPA, 2024	12.648	3.162 ww	EPA, 2024	1.01	1.002	Sample et al., 1996
Anti-acid reflux	Ranitidine	Anti-acid	66357-35-5	0.27	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Antiasthmatic	Albuterol	Antiasthn	18559-94-9	0.64	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Antiasthmatic	Theophylline	Antiasthn	58-55-9	-0.04	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Antibacterial	Penicillin V	Antibacte	87-08-1	2.09	EPA, 2024	12.648	3.162 ww	EPA, 2024	1.005	1	Sample et al., 1996
Antibiotic	4-Epitetracycline [ETC]	Antibiotic	23313-80-6	-2.85	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Antibiotic	Enrofloxacin	Antibiotic	93106-60-6	0.7	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Anticonvulsant	Benztropine	Anticonvu	86-13-5	4.28	EPA, 2024	1245.2	311.3 ww	EPA, 2024	1.491	1.178	Sample et al., 1996
Anticonvulsant	Carbamazepine	Anticonvu	298-46-4	2.45	EPA, 2024	76.84	19.21 ww	EPA, 2024	1.01	1.002	Sample et al., 1996
Antidepressant	10-hydroxy-amitriptyline	Antidepre	1159-82-6	3.41	EPA, 2024	330.56	82.64 ww	EPA, 2024	1.067	1.014	Sample et al., 1996
Antidepressant	Amitriptyline	Antidepre	50-48-6	4.92	EPA, 2024	3275.6	818.9 ww	EPA, 2024	2.78	2.193	Sample et al., 1996
Antidiabetic drug	Glipizide	Antidiabe	29094-61-9	1.91	EPA, 2024	33.828	8.457 ww	EPA, 2024	1	1	Sample et al., 1996
Antidiabetic drug	Glyburide	Antidiabe	10238-21-8	4.79	EPA, 2024	2689.2	672.3 ww	EPA, 2024	2.452	1.871	Sample et al., 1996

Table C-15 Bioconcentration Factors and Food Chain Multipliers

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Analyte Group	CAS No.	Log Kow		Water-Fish BCF[a] (dry weight) (L/kg)			Food Chain Multiplier		
				LogKow	Source	BCF (L/kg)	Note	Source	Trophic Level 3	Trophic Level 4	Reference
Antidiabetic drug	Metformin	Antidiabe	657-24-9	-2.64	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Antifungal agent	Miconazole	Antifunga	22916-47-8	6.25	EPA, 2024	24768	6192 ww	EPA, 2024	12.691	21.677	Sample et al., 1996
Antihistamine	Diphenhydramine	Antihistar	58-73-1	3.27	EPA, 2024	267.04	66.76 ww	EPA, 2024	1.053	1.012	Sample et al., 1996
Antihistamine	Promethazine	Antihistar	60-87-7	4.81	EPA, 2024	2771.2	692.8 ww	EPA, 2024	2.452	1.871	Sample et al., 1996
Antihypertensive	Desmethyldiltiazem	Antihyper	42399-41-7	2.7	EPA, 2024	112.32	28.08 ww	EPA, 2024	1.01	1.002	Sample et al., 1996
Antihypertensive	Diltiazem	Antihyper	42399-41-7	2.7	EPA, 2024	112.32	28.08 ww	EPA, 2024	1.01	1.002	Sample et al., 1996
Antihypertensive	Valsartan	Antihyper	137862-53-4	3.65	EPA, 2024	400	100 ww	Veith et al. 1979	1.128	1.033	Sample et al., 1996
Antihypertensive	Verapamil	Antihyper	52-53-9	3.79	EPA, 2024	588.4	147.1 ww	EPA, 2024	1.161	1.042	Sample et al., 1996
Antilipemic	Gemfibrozil	Antilipem	25812-30-0	4.77	EPA, 2024	12.648	3.162 ww	EPA, 2024	2.452	1.871	Sample et al., 1996
Antimicrobial, disinfectant	Triclocarban	Antimicro	101-20-2	4.9	EPA, 2024	3186	796.5 ww	EPA, 2024	2.78	2.193	Sample et al., 1996
Antimicrobial, disinfectant	Triclosan	Antimicro	3380-34-5	4.76	EPA, 2024	2568.8	642.2 ww	EPA, 2024	2.452	1.871	Sample et al., 1996
Antipyretic, analgesic	Acetaminophen	Antipyreti	103-90-2	0.46	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	Antispasn	611-59-6	-0.22	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Betablocker	Atenolol	Betablock	29122-68-7	0.16	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Betablocker	Metoprolol	Betablock	51384-51-1	1.88	EPA, 2024	17.944	4.486 ww	EPA, 2024	1	1	Sample et al., 1996
Betablocker	Propranolol	Betablock	525-66-6	3.48	EPA, 2024	203.96	50.99 ww	EPA, 2024	1.083	1.019	Sample et al., 1996
BloodThinner	Warfarin	BloodThir	81-81-2	2.7	EPA, 2024	112.32	28.08 ww	EPA, 2024	1.01	1.002	Sample et al., 1996
ChannelBlocker	Amlodipine	ChannelB	88150-42-9	3	EPA, 2024	177.2	44.3 ww	EPA, 2024	1.028	1.007	Sample et al., 1996
ChannelBlocker	Dehydronifedipine	ChannelB	67035-22-7	3.15	EPA, 2024	222.96	55.74 ww	EPA, 2024	1.042	1.009	Sample et al., 1996
ChannelBlocker	Norverapamil	ChannelB	67018-85-3	4.59	EPA, 2024	1970.4	492.6 ww	EPA, 2024	1.95	1.459	Sample et al., 1996
Cocaine metabolite	Benzoylecgonine	Cocaine n	519-09-5	-1.32	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Contraceptive	Norgestrel	Contracep	6533-00-2	3.48	EPA, 2024	367.32	91.83 ww	EPA, 2024	1.083	1.019	Sample et al., 1996
Corticosteroid	Hydrocortisone	Corticoste	50-23-7	1.61	EPA, 2024	21.444	5.361 ww	EPA, 2024	1	1	Sample et al., 1996
Depressant	Alprazolam	Depressar	28981-97-7	2.12	EPA, 2024	46.56	11.64 ww	EPA, 2024	1.005	1	Sample et al., 1996
Depressant	Diazepam	Depressar	439-14-5	2.82	EPA, 2024	134.8	33.7 ww	EPA, 2024	1.028	1.007	Sample et al., 1996
Diuretic	Furosemide	Diuretic	54-31-9	2.03	EPA, 2024	12.648	3.162 ww	EPA, 2024	1.005	1	Sample et al., 1996
Diuretic	Hydrochlorothiazide	Diuretic	58-93-5	-0.07	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Diuretic	Triamterene	Diuretic	396-01-0	0.98	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Fungicide and parasiticide	Thiabendazole	Fungicide	148-79-8	2.47	EPA, 2024	79.2	19.8 ww	EPA, 2024	1.01	1.002	Sample et al., 1996
Glycoside	Digoxin	Glycoside	20830-75-5	1.26	EPA, 2024	12.6	3.15 ww	EPA, 2024	1	1	Sample et al., 1996
Lincosamide antibiotic	Lincomycin	Lincosam	154-21-2	0.2	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Macrolide antibiotic	Azithromycin	Macrolide	83905-01-5	4.02	EPA, 2024	834.4	208.6 ww	EPA, 2024	1.253	1.072	Sample et al., 1996
Macrolide antibiotic	Clarithromycin	Macrolide	81103-11-9	3.16	EPA, 2024	225.96	56.49 ww	EPA, 2024	1.042	1.009	Sample et al., 1996
Macrolide antibiotic	Erythromycin-H2O	Macrolide	114-07-8	3.06	EPA, 2024	194.12	48.53 ww	EPA, 2024	1.034	1.007	Sample et al., 1996
Macrolide antibiotic	Roxithromycin	Macrolide	80214-83-1	2.75	EPA, 2024	121.36	30.34 ww	EPA, 2024	1.028	1.007	Sample et al., 1996
Macrolide antibiotic	Tylosin	Macrolide	1401-69-0	1.63	EPA, 2024	22.108	5.527 ww	EPA, 2024	1	1	Sample et al., 1996
Nicotinemetabolite	Cotinine	Nicotinem	486-56-6	0.07	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Non-steroidalanti-inflammatory drug	Naproxen	Non-stero	22204-53-1	3.18	EPA, 2024	12.648	3.162 ww	EPA, 2024	1.042	1.009	Sample et al., 1996
Oil & Grease	Oil and Grease, Total (HEM)	Oil & Grea	--		EPA, 2024	0	ww	EPA, 2024			Sample et al., 1996
Opiate	Codeine	Opiate	76-57-3	1.19	EPA, 2024	11.328	2.832 ww	EPA, 2024	1	1	Sample et al., 1996
Opiate	Hydrocodone	Opiate	125-29-1	2.16	EPA, 2024	49.8	12.45 ww	EPA, 2024	1.005	1	Sample et al., 1996
Opiate	Oxycodone	Opiate	76-42-6	0.66	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Opiod	Propoxyphene	Opiod	469-62-5	4.18	EPA, 2024	1064.4	266.1 ww	EPA, 2024	1.38	1.13	Sample et al., 1996
PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-209)	PBDEs	1163-19-5	12.11	EPA, 2024	166.84	41.71 ww	EPA, 2024	1.493	0.226	Sample et al., 1996
PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	PBDEs	32534-81-9	6.84	EPA, 2024	60560	15140 ww	EPA, 2024	14.355	26.669	Sample et al., 1996
PBDEs	2,2',3,4,4',5,5',6-OcBDE	PBDEs	337513-72-1	8.71	EPA, 2024	7728	1932 ww	EPA, 2024	2.732	0.778	Sample et al., 1996

Table C-15 Bioconcentration Factors and Food Chain Multipliers

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Analyte Group	Analyte	Analyte Group	CAS No.	Log Kow		Water-Fish BCF[a] (dry weight) (L/kg)			Food Chain Multiplier		
				LogKow	Source	BCF (L/kg)	Note	Source	Trophic Level 3	Trophic Level 4	Reference
PBDEs	2,2',3,4,4',5',6-HpBDE	PBDEs	207122-16-5	9.44	EPA, 2024	3393.2	848.3 ww	EPA, 2024	1.493	0.226	Sample et al., 1996
PBDEs	2,2',3,4,4',5'-HxBDE	PBDEs	182677-30-1	8.55	EPA, 2024	9264	2316 ww	EPA, 2024	3.296	1.146	Sample et al., 1996
PBDEs	2,2',3,4,4',6'-HxBDE	PBDEs	243982-83-4	8.55	EPA, 2024	9264	2316 ww	EPA, 2024	3.296	1.146	Sample et al., 1996
PBDEs	2,2',3,4,4'-PeBDE	PBDEs	182346-21-0	7.66	EPA, 2024	25280	6320 ww	EPA, 2024	10.914	14.388	Sample et al., 1996
PBDEs	2,2',4,4',5,5'-HxBDE	PBDEs	68631-49-2	8.55	EPA, 2024	9264	2316 ww	EPA, 2024	3.296	1.146	Sample et al., 1996
PBDEs	2,2',4,4',5,6'-HxBDE	PBDEs	207122-15-4	8.55	EPA, 2024	9264	2316 ww	EPA, 2024	3.296	1.146	Sample et al., 1996
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	PBDEs	60348-60-9	6.84	EPA, 2024	60560	15140 ww	EPA, 2024	14.355	26.669	Sample et al., 1996
PBDEs	2,2',4,4',6,6'-HxBDE	PBDEs	35854-94-5	8.55	EPA, 2024	9264	2316 ww	EPA, 2024	3.296	1.146	Sample et al., 1996
PBDEs	2,2',4,4',6-PeBDE	PBDEs	189084-64-8	7.66	EPA, 2024	25280	6320 ww	EPA, 2024	10.914	14.388	Sample et al., 1996
PBDEs	2,2',4,4'-TeBDE (BDE-47)	PBDEs	5436-43-1	6.77	EPA, 2024	54400	13600 ww	EPA, 2024	14.355	26.669	Sample et al., 1996
PBDEs	2,2',4,5'-TeBDE	PBDEs	243982-82-3	6.77	EPA, 2024	54400	13600 ww	EPA, 2024	14.355	26.669	Sample et al., 1996
PBDEs	2,2',4,6'-TeBDE	PBDEs	189084-57-9	6.77	EPA, 2024	54400	13600 ww	EPA, 2024	14.355	26.669	Sample et al., 1996
PBDEs	2,2',4-TriBDE	PBDEs	147217-75-2	5.88	EPA, 2024	14076	3519 ww	EPA, 2024	9.716	13.964	Sample et al., 1996
PBDEs	2,3',4,4',6-PeBDE	PBDEs	189084-66-0	7.66	EPA, 2024	25280	6320 ww	EPA, 2024	10.914	14.388	Sample et al., 1996
PBDEs	2,3',4,4'-TeBDE	PBDEs	189084-61-5	6.77	EPA, 2024	54400	13600 ww	EPA, 2024	14.355	26.669	Sample et al., 1996
PBDEs	2,3',4',6-TeBDE	PBDEs	189084-62-6	6.77	EPA, 2024	54400	13600 ww	EPA, 2024	14.355	26.669	Sample et al., 1996
PBDEs	2,4,4'-TriBDE	PBDEs	41318-75-6	5.88	EPA, 2024	14076	3519 ww	EPA, 2024	9.716	13.964	Sample et al., 1996
Pesticides	2,4'-DDD	Pesticides	53-19-0	5.87	EPA, 2024	13944	3486 ww	EPA, 2024	9.716	13.964	Sample et al., 1996
Pesticides	4,4'-DDD	Pesticides	72-54-8	6.02	EPA, 2024	17420	4355 ww	EPA, 2024	10.556	15.996	Sample et al., 1996
Pesticides	4,4'-DDE	Pesticides	72-55-9	6.51	EPA, 2024	36672	9168 ww	EPA, 2024	13.662	24.604	Sample et al., 1996
Pesticides	4,4'-DDT	Pesticides	50-29-3	6.91	EPA, 2024	67360	16840 ww	EPA, 2024	14.388	26.669	Sample et al., 1996
Pesticides	Aldrin	Pesticides	309-00-2	6.5	EPA, 2024	36120	9030 ww	EPA, 2024	13.662	24.604	Sample et al., 1996
Pesticides	Chlordane, alpha (cis)	Pesticides	5103-71-9	6.22	EPA, 2024	23604	5901 ww	EPA, 2024	12.064	19.907	Sample et al., 1996
Pesticides	Chlorpyriphos	Pesticides	2921-88-2	4.96	EPA, 2024	3480.8	870.2 ww	EPA, 2024	3.181	2.612	Sample et al., 1996
Pesticides	Chlorpyriphos-Methyl	Pesticides	5598-13-0	4.31	EPA, 2024	1296.4	324.1 ww	EPA, 2024	1.491	1.178	Sample et al., 1996
Pesticides	Cypermethrin	Pesticides	52315-07-8	6.94	EPA, 2024	3881.2	970.3 ww	EPA, 2024	14.388	26.669	Sample et al., 1996
Pesticides	DEET	Pesticides	134-62-3	2.18	EPA, 2024	51	12.75 ww	EPA, 2024	1.005	1	Sample et al., 1996
Pesticides	Demeton-O,S	Pesticides	126-75-0	1.99	EPA, 2024	38.352	9.588 ww	EPA, 2024	1	1	Sample et al., 1996
Pesticides	Dieldrin	Pesticides	60-57-1	5.2	EPA, 2024	5012	1253 ww	EPA, 2024	4.188	3.873	Sample et al., 1996
Pesticides	Endosulfan Sulfate	Pesticides	1031-07-8	3.66	EPA, 2024	482.8	120.7 ww	EPA, 2024	1.128	1.033	Sample et al., 1996
Pesticides	Endrin	Pesticides	72-20-8	5.2	EPA, 2024	5012	1253 ww	EPA, 2024	4.188	3.873	Sample et al., 1996
Pesticides	Endrin Ketone	Pesticides	53494-70-5	4.99	EPA, 2024	3623.2	905.8 ww	EPA, 2024	3.181	2.612	Sample et al., 1996
Pesticides	HCH, alpha	Pesticides	319-84-6	4.14	EPA, 2024	1001.6	250.4 ww	EPA, 2024	1.315	1.096	Sample et al., 1996
Pesticides	HCH, beta	Pesticides	319-85-7	4.14	EPA, 2024	1001.6	250.4 ww	EPA, 2024	1.315	1.096	Sample et al., 1996
Pesticides	HCH, gamma	Pesticides	58-89-9	4.14	EPA, 2024	1001.6	250.4 ww	EPA, 2024	1.315	1.096	Sample et al., 1996
Pesticides	Heptachlor	Pesticides	76-44-8	5.47	EPA, 2024	7552	1888 ww	EPA, 2024	6.266	7.079	Sample et al., 1996
Pesticides	Hexachlorobenzene	Pesticides	118-74-1	5.73	EPA, 2024	11212	2803 ww	EPA, 2024	7.962	10.209	Sample et al., 1996
Pesticides	Malathion	Pesticides	121-75-5	2.36	EPA, 2024	67	16.75 ww	EPA, 2024	1.01	1.002	Sample et al., 1996
Pesticides	Methoxychlor	Pesticides	72-43-5	5.08	EPA, 2024	4176	1044 ww	EPA, 2024	3.643	3.162	Sample et al., 1996
Pesticides	Permethrin	Pesticides	52645-53-1	6.5	EPA, 2024	1989.2	497.3 ww	EPA, 2024	13.662	24.604	Sample et al., 1996
PFAS	5:3 FTCA	PFAS	1799325-94-2	4.46	EPA, 2024	12.648	3.162 ww	EPA, 2024	1.766	1.334	Sample et al., 1996
PFAS	PFBA	PFAS	375-22-4	2.14	EPA, 2024	12.648	3.162 ww	EPA, 2024	1.005	1	Sample et al., 1996
PFAS	PFHpA	PFAS	375-85-9	4.14	EPA, 2024	12.648	3.162 ww	EPA, 2024	1.315	1.096	Sample et al., 1996
PFAS	PFHxA	PFAS	307-24-4	3.48	EPA, 2024	12.648	3.162 ww	EPA, 2024	1.083	1.019	Sample et al., 1996
PFAS	PFHxS	PFAS	355-46-4	3.16	EPA, 2024	12.648	3.162 ww	EPA, 2024	1.042	1.009	Sample et al., 1996
PFAS	PFNA	PFAS	375-95-1	5.48	EPA, 2024	40	10 ww	EPA, 2024	6.266	7.079	Sample et al., 1996

Table C-15 Bioconcentration Factors and Food Chain Multipliers

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Analyte Group	CAS No.	Log Kow		Water-Fish BCF[a] (dry weight) (L/kg)			Food Chain Multiplier		
				LogKow	Source	BCF (L/kg)	Note	Source	Trophic Level 3	Trophic Level 4	Reference
PFAS	PFOA	PFAS	335-67-1	4.81	EPA, 2024	12.648	3.162 ww	EPA, 2024	2.452	1.871	Sample et al., 1996
PFAS	PFOS	PFAS	1763-23-1	4.49	EPA, 2024	12.648	3.162 ww	EPA, 2024	1.766	1.334	Sample et al., 1996
PFAS	PFPeA	PFAS	2706-90-3	2.81	EPA, 2024	12.648	3.162 ww	EPA, 2024	1.028	1.007	Sample et al., 1996
PFAS	PFPeS	PFAS	175905-36-9	2.49	EPA, 2024	12.648	3.162 ww	EPA, 2024	1.01	1.002	Sample et al., 1996
Plasticizer	Bisphenol A	Plasticize	80-05-7	3.32	EPA, 2024	288.12	72.03 ww	EPA, 2024	1.053	1.012	Sample et al., 1996
Plasticizer	Bisphenol S	Plasticize	80-09-1	1.65	EPA, 2024	22.672	5.668 ww	EPA, 2024	1	1	Sample et al., 1996
Pyrimidine antibiotic	Trimethoprim	Pyrimidin	738-70-5	0.91	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Quinoline antibiotic	Ciprofloxacin	Quinoline	85721-33-1	0.28	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Quinoline antibiotic	Ofloxacin	Quinoline	82419-36-1	-0.39	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Rubber Stabilizing compound	6PPD-Quinone	Rubber St	2754428-18-5	3.98	EPA, 2024	781.6	195.4 ww	EPA, 2024	1.253	1.072	Sample et al., 1996
Sex hormone	17 beta-Estradiol	Sex hormo	50-28-2	4.01	EPA, 2024	822	205.5 ww	EPA, 2024	1.253	1.072	Sample et al., 1996
Sex hormone	Estrone	Sex hormo	53-16-7	3.13	EPA, 2024	215.88	53.97 ww	EPA, 2024	1.034	1.007	Sample et al., 1996
Sex hormone	Progesterone	Sex hormo	57-83-0	3.87	EPA, 2024	664.4	166.1 ww	EPA, 2024	1.202	1.054	Sample et al., 1996
Sex hormone	Testosterone	Sex hormo	58-22-0	3.32	EPA, 2024	288.12	72.03 ww	EPA, 2024	1.053	1.012	Sample et al., 1996
SSRI Antidepressant	Fluoxetine	SSRI Antid	54910-89-3	3.82	EPA, 2024	616	154 ww	EPA, 2024	1.161	1.042	Sample et al., 1996
SSRI Antidepressant	Norfluoxetine	SSRI Antid	83891-03-6	4.18	EPA, 2024	1068	267 ww	EPA, 2024	1.38	1.13	Sample et al., 1996
SSRI Antidepressant	Paroxetine	SSRI Antid	61869-08-7	3.95	EPA, 2024	754.4	188.6 ww	EPA, 2024	1.253	1.072	Sample et al., 1996
SSRI Antidepressant	Sertraline	SSRI Antid	79617-96-2	5.29	EPA, 2024	5716	1429 ww	EPA, 2024	4.803	4.742	Sample et al., 1996
Statin	Atorvastatin	Statin	134523-00-5	6.36	EPA, 2024	224.92	56.23 ww	EPA, 2024	13.228	23.281	Sample et al., 1996
Steroid	Methylprednisolone	Steroid	83-43-2	1.82	EPA, 2024	29.396	7.349 ww	EPA, 2024	1	1	Sample et al., 1996
Steroid	Prednisolone	Steroid	50-24-8	1.62	EPA, 2024	21.772	5.443 ww	EPA, 2024	1	1	Sample et al., 1996
Steroidal Estrogen	Equilenin	Steroidal	517-09-9	3.93	EPA, 2024	726.4	181.6 ww	EPA, 2024	1.202	1.054	Sample et al., 1996
Stimulant	Amphetamine	Stimulant	300-62-9	1.76	EPA, 2024	26.936	6.734 ww	EPA, 2024	1	1	Sample et al., 1996
Stimulant	Caffeine	Stimulant	58-08-2	-0.07	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Stimulant	Cocaine	Stimulant	50-36-2	2.3	EPA, 2024	61.16	15.29 ww	EPA, 2024	1.01	1.002	Sample et al., 1996
Streoid	Prednisone	Streoid	53-03-2	1.46	EPA, 2024	17.076	4.269 ww	EPA, 2024	1	1	Sample et al., 1996
Sulfonamide antibiotic	Sulfadiazine	Sulfonam	68-35-9	-0.09	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Sulfonamide antibiotic	Sulfamethizole	Sulfonam	144-82-1	0.54	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Sulfonamide antibiotic	Sulfamethoxazole	Sulfonam	723-46-6	0.89	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Sulfonamide antibiotic	Sulfanilamide	Sulfonam	63-74-1	-0.62	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
SVOCs/PAHs	1,2-Diphenylhydrazine	SVOCs/PA	122-66-7	2.94	EPA, 2024	161.76	40.44 ww	EPA, 2024	1.028	1.007	Sample et al., 1996
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	SVOCs/PA	2245-38-7	4.81	EPA, 2024	2775.2	693.8 ww	EPA, 2024	2.452	1.871	Sample et al., 1996
SVOCs/PAHs	1-Methyldibenzothiophene	SVOCs/PA	31317-07-4	4.71	EPA, 2024	2390	597.5 ww	EPA, 2024	2.175	1.633	Sample et al., 1996
SVOCs/PAHs	1-Methylfluorene	SVOCs/PA	1730-37-6	4.97	EPA, 2024	3534	883.5 ww	EPA, 2024	3.181	2.612	Sample et al., 1996
SVOCs/PAHs	1-Methylnaphthalene	SVOCs/PA	90-12-0	3.87	EPA, 2024	664.4	166.1 ww	EPA, 2024	1.202	1.054	Sample et al., 1996
SVOCs/PAHs	1-Methylphenanthrene	SVOCs/PA	832-69-9	5.08	EPA, 2024	19132	4783 ww	EPA, 2024	3.643	3.162	Sample et al., 1996
SVOCs/PAHs	2,4,6-Trichlorophenol	SVOCs/PA	88-06-2	3.69	EPA, 2024	505.6	126.4 ww	EPA, 2024	1.128	1.033	Sample et al., 1996
SVOCs/PAHs	2,6-Dimethylnaphthalene	SVOCs/PA	581-42-0	4.31	EPA, 2024	1296.4	324.1 ww	EPA, 2024	1.491	1.178	Sample et al., 1996
SVOCs/PAHs	2-Methylanthracene	SVOCs/PA	613-12-7	5	EPA, 2024	3698.8	924.7 ww	EPA, 2024	3.181	2.612	Sample et al., 1996
SVOCs/PAHs	2-Methylfluoranthene	SVOCs/PA	33543-31-6	5.48	EPA, 2024	7672	1918 ww	EPA, 2024	6.266	7.079	Sample et al., 1996
SVOCs/PAHs	2-Methylnaphthalene	SVOCs/PA	91-57-6	3.86	EPA, 2024	654.4	163.6 ww	EPA, 2024	1.202	1.054	Sample et al., 1996
SVOCs/PAHs	2-Methylphenanthrene	SVOCs/PA	2531-84-2	4.86	EPA, 2024	13696	3424 ww	EPA, 2024	2.78	2.193	Sample et al., 1996
SVOCs/PAHs	3,6-Dimethylphenanthrene	SVOCs/PA	1576-67-6	5.44	EPA, 2024	33036	8259 ww	EPA, 2024	5.502	5.821	Sample et al., 1996
SVOCs/PAHs	3-Methylphenanthrene	SVOCs/PA	832-71-3	4.86	EPA, 2024	13696	3424 ww	EPA, 2024	2.78	2.193	Sample et al., 1996
SVOCs/PAHs	4-Methyldibenzothiophene	SVOCs/PA	7372-88-5	4.71	EPA, 2024	2390	597.5 ww	EPA, 2024	2.175	1.633	Sample et al., 1996
SVOCs/PAHs	Acenaphthene	SVOCs/PA	83-32-9	3.92	EPA, 2024	716.8	179.2 ww	EPA, 2024	1.202	1.054	Sample et al., 1996

Table C-15 Bioconcentration Factors and Food Chain Multipliers

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Analyte Group	CAS No.	Log Kow		Water-Fish BCF[a] (dry weight) (L/kg)			Food Chain Multiplier		
				LogKow	Source	BCF (L/kg)	Note	Source	Trophic Level 3	Trophic Level 4	Reference
SVOCs/PAHs	Acenaphthylene	SVOCs/PA	208-96-8	3.94	EPA, 2024	739.2	184.8 ww	EPA, 2024	1.202	1.054	Sample et al., 1996
SVOCs/PAHs	Anthracene	SVOCs/PA	120-12-7	4.45	EPA, 2024	1604	401 ww	EPA, 2024	1.766	1.334	Sample et al., 1996
SVOCs/PAHs	Benz(a)anthracene	SVOCs/PA	56-55-3	5.76	EPA, 2024	11736	2934 ww	EPA, 2024	8.841	12.05	Sample et al., 1996
SVOCs/PAHs	Benzo(a)fluoranthene	SVOCs/PA	205-99-2	5.78	EPA, 2024	12096	3024 ww	EPA, 2024	8.841	12.05	Sample et al., 1996
SVOCs/PAHs	Benzo(a)pyrene	SVOCs/PA	50-32-8	6.13	EPA, 2024	20588	5147 ww	EPA, 2024	11.337	17.783	Sample et al., 1996
SVOCs/PAHs	Benzo(b)fluoranthene	SVOCs/PA	205-99-2	5.78	EPA, 2024	12096	3024 ww	EPA, 2024	8.841	12.05	Sample et al., 1996
SVOCs/PAHs	Benzo(b)fluorene	SVOCs/PA	243-17-4	5.77	EPA, 2024	11916	2979 ww	EPA, 2024	8.841	12.05	Sample et al., 1996
SVOCs/PAHs	Benzo(e)pyrene	SVOCs/PA	192-97-2	6.44	EPA, 2024	32976	8244 ww	EPA, 2024	13.228	23.281	Sample et al., 1996
SVOCs/PAHs	Benzo(g,h,i)perylene	SVOCs/PA	191-24-2	6.63	EPA, 2024	44000	11000 ww	EPA, 2024	13.98	25.645	Sample et al., 1996
SVOCs/PAHs	Benzo(k,j)fluoranthene	SVOCs/PA	207-08-9	6.11	EPA, 2024	19972	4993 ww	EPA, 2024	11.337	17.783	Sample et al., 1996
SVOCs/PAHs	Benzothiophene	SVOCs/PA	95-15-8	3.12	EPA, 2024	212.64	53.16 ww	EPA, 2024	1.034	1.007	Sample et al., 1996
SVOCs/PAHs	Biphenyl	SVOCs/PA	92-52-4	4.01	EPA, 2024	822	205.5 ww	EPA, 2024	1.253	1.072	Sample et al., 1996
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	SVOCs/PA	117-81-7	7.6	EPA, 2024	6848	1712 ww	EPA, 2024	11.708	16.749	Sample et al., 1996
SVOCs/PAHs	Butyl Benzyl Phthalate	SVOCs/PA	85-68-7	4.73	EPA, 2024	2454.4	613.6 ww	EPA, 2024	2.175	1.633	Sample et al., 1996
SVOCs/PAHs	Carbazole	SVOCs/PA	86-74-8	3.72	EPA, 2024	529.2	132.3 ww	EPA, 2024	1.128	1.033	Sample et al., 1996
SVOCs/PAHs	Chrysene/Triphenylene	SVOCs/PA	218-01-9, 217-	5.81	EPA, 2024	12660	3165 ww	EPA, 2024	8.841	12.05	Sample et al., 1996
SVOCs/PAHs	cis/trans Decalin	SVOCs/PA	493-01-6	4.2	EPA, 2024	1091.2	272.8 ww	EPA, 2024	1.38	1.13	Sample et al., 1996
SVOCs/PAHs	Dibenzo(a,h)anthracene	SVOCs/PA	53-70-3	6.54	EPA, 2024	38384	9596 ww	EPA, 2024	13.662	24.604	Sample et al., 1996
SVOCs/PAHs	Dibenzofuran	SVOCs/PA	132-64-9	4.12	EPA, 2024	971.6	242.9 ww	EPA, 2024	1.315	1.096	Sample et al., 1996
SVOCs/PAHs	Dibenzothiophene	SVOCs/PA	132-65-0	4.38	EPA, 2024	1442	360.5 ww	EPA, 2024	1.614	1.242	Sample et al., 1996
SVOCs/PAHs	Diethyl Phthalate	SVOCs/PA	84-66-2	2.42	EPA, 2024	73.4	18.35 ww	EPA, 2024	1.01	1.002	Sample et al., 1996
SVOCs/PAHs	Dimethyl Phthalate	SVOCs/PA	131-11-3	1.6	EPA, 2024	21.124	5.281 ww	EPA, 2024	1	1	Sample et al., 1996
SVOCs/PAHs	Di-n-butyl Phthalate	SVOCs/PA	84-74-2	4.5	EPA, 2024	1730.4	432.6 ww	EPA, 2024	1.766	1.334	Sample et al., 1996
SVOCs/PAHs	Di-n-octyl Phthalate	SVOCs/PA	117-84-0	8.1	EPA, 2024	3895.6	973.9 ww	EPA, 2024	7.278	6.012	Sample et al., 1996
SVOCs/PAHs	Fluoranthene	SVOCs/PA	206-44-0	5.16	EPA, 2024	4716	1179 ww	EPA, 2024	4.188	3.873	Sample et al., 1996
SVOCs/PAHs	Fluorene	SVOCs/PA	86-73-7	4.18	EPA, 2024	1064.4	266.1 ww	EPA, 2024	1.38	1.13	Sample et al., 1996
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	SVOCs/PA	193-39-5	6.7	EPA, 2024	48720	12180 ww	EPA, 2024	14.223	26.363	Sample et al., 1996
SVOCs/PAHs	Isophorone	SVOCs/PA	78-59-1	1.7	EPA, 2024	24.588	6.147 ww	EPA, 2024	1	1	Sample et al., 1996
SVOCs/PAHs	Naphthalene	SVOCs/PA	91-20-3	3.3	EPA, 2024	279.52	69.88 ww	EPA, 2024	1.053	1.012	Sample et al., 1996
SVOCs/PAHs	Naphthobenzothiophene	SVOCs/PA	205-43-6	5.19	EPA, 2024	4936	1234 ww	EPA, 2024	4.188	3.873	Sample et al., 1996
SVOCs/PAHs	N-Nitrosodimethylamine	SVOCs/PA	62-75-9	-0.57	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
SVOCs/PAHs	Pentachlorophenol (PCP)	SVOCs/PA	87-86-5	5.12	EPA, 2024	4440	1110 ww	EPA, 2024	3.643	3.162	Sample et al., 1996
SVOCs/PAHs	Perylene	SVOCs/PA	198-55-0	6.25	EPA, 2024	24708	6177 ww	EPA, 2024	12.691	21.677	Sample et al., 1996
SVOCs/PAHs	Phenanthrene	SVOCs/PA	85-01-8	4.46	EPA, 2024	7460	1865 ww	EPA, 2024	1.766	1.334	Sample et al., 1996
SVOCs/PAHs	Phenol	SVOCs/PA	108-95-2	1.46	EPA, 2024	17.076	4.269 ww	EPA, 2024	1	1	Sample et al., 1996
SVOCs/PAHs	Pyrene	SVOCs/PA	129-00-0	4.88	EPA, 2024	3082.4	770.6 ww	EPA, 2024	2.78	2.193	Sample et al., 1996
SVOCs/PAHs	Retene	SVOCs/PA	483-65-8	6.35	EPA, 2024	131400	32850 ww	EPA, 2024	12.691	21.677	Sample et al., 1996
Tetracycline antibiotic	Doxycycline	Tetracycli	564-25-0	-0.02	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Tetracycline antibiotic	Tetracycline [TC]	Tetracycli	60-54-8	-1.3	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Tranquilizer	Meprobamate	Tranquiliz	57-53-4	0.7	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
Urinary steroid	Androsterone	Urinary st	53-41-8	3.69	EPA, 2024	505.6	126.4 ww	EPA, 2024	1.128	1.033	Sample et al., 1996
VOCs	1,1,1-Trichloroethane (TCA)	VOCs	71-55-6	2.49	EPA, 2024	81.64	20.41 ww	EPA, 2024	1.01	1.002	Sample et al., 1996
VOCs	1,2-Dichloroethane (EDC)	VOCs	107-06-2	1.48	EPA, 2024	17.604	4.401 ww	EPA, 2024	1	1	Sample et al., 1996
VOCs	1,4-Dichlorobenzene	VOCs	106-46-7	3.44	EPA, 2024	345.76	86.44 ww	EPA, 2024	1.067	1.014	Sample et al., 1996
VOCs	2-Butanone (MEK)	VOCs	78-93-3	0.29	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
VOCs	2-Hexanone	VOCs	591-78-6	1.38	EPA, 2024	15.12	3.78 ww	EPA, 2024	1	1	Sample et al., 1996

Table C-15 Bioconcentration Factors and Food Chain Multipliers

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Analyte Group	CAS No.	Log Kow		Water-Fish BCF[a] (dry weight) (L/kg)			Food Chain Multiplier		
				LogKow	Source	BCF (L/kg)	Note	Source	Trophic Level 3	Trophic Level 4	Reference
VOCs	Acetone	VOCs	67-64-1	-0.24	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
VOCs	Acrolein	VOCs	107-02-8	-0.01	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
VOCs	Benzene	VOCs	71-43-2	2.13	EPA, 2024	47.24	11.81 ww	EPA, 2024	1.005	1	Sample et al., 1996
VOCs	Bromodichloromethane	VOCs	75-27-4	2	EPA, 2024	38.784	9.696 ww	EPA, 2024	1.005	1	Sample et al., 1996
VOCs	Bromomethane	VOCs	74-83-9	1.19	EPA, 2024	11.328	2.832 ww	EPA, 2024	1	1	Sample et al., 1996
VOCs	Carbon Disulfide	VOCs	75-15-0	1.94	EPA, 2024	35.404	8.851 ww	EPA, 2024	1	1	Sample et al., 1996
VOCs	Chlorobenzene	VOCs	108-90-7	2.84	EPA, 2024	138.96	34.74 ww	EPA, 2024	1.028	1.007	Sample et al., 1996
VOCs	Chloroethane	VOCs	75-00-3	1.43	EPA, 2024	16.316	4.079 ww	EPA, 2024	1	1	Sample et al., 1996
VOCs	Chloroform	VOCs	67-66-3	1.97	EPA, 2024	37.056	9.264 ww	EPA, 2024	1	1	Sample et al., 1996
VOCs	Chloromethane	VOCs	74-87-3	0.91	EPA, 2024	12.648	3.162 ww	EPA, 2024	1	1	Sample et al., 1996
VOCs	cis-1,2-Dichloroethene	VOCs	156-59-2	2	EPA, 2024	38.784	9.696 ww	EPA, 2024	1.005	1	Sample et al., 1996
VOCs	Dichloromethane (Methylene Chloride)	VOCs	75-09-2	1.25	EPA, 2024	12.412	3.103 ww	EPA, 2024	1	1	Sample et al., 1996
VOCs	Ethylbenzene	VOCs	100-41-4	3.15	EPA, 2024	222.56	55.64 ww	EPA, 2024	1.042	1.009	Sample et al., 1996
VOCs	m,p-Xylenes	VOCs	179601-23-1	3.16	EPA, 2024	226	56.5 ww	EPA, 2024	1.042	1.009	Sample et al., 1996
VOCs	o-Xylene	VOCs	95-47-6	3.16	EPA, 2024	225.96	56.49 ww	EPA, 2024	1.042	1.009	Sample et al., 1996
VOCs	Styrene	VOCs	100-42-5	2.95	EPA, 2024	164.24	41.06 ww	EPA, 2024	1.028	1.007	Sample et al., 1996
VOCs	Tetrachloroethene (PCE)	VOCs	127-18-4	3.4	EPA, 2024	325.36	81.34 ww	EPA, 2024	1.067	1.014	Sample et al., 1996
VOCs	Toluene	VOCs	108-88-3	2.73	EPA, 2024	117.56	29.39 ww	EPA, 2024	1.01	1.002	Sample et al., 1996
VOCs	Trichloroethene (TCE)	VOCs	79-01-6	2.42	EPA, 2024	73.4	18.35 ww	EPA, 2024	1.01	1.002	Sample et al., 1996
VOCs	Vinyl Chloride	VOCs	75-01-4	1.62	EPA, 2024	21.884	5.471 ww	EPA, 2024	1	1	Sample et al., 1996

Notes:

--- = Not available

[a] Bioconcentration factors were assumed to be dry weight unless specifically noted to be wet weight. Wet weight values were converted to dry weight assuming a water content of 75 percent for fish as follows: wet weight/0.25 (Sample et al., 1997).

BCF = Bioconcentration factor

ww = weight weight

L/kg = liters per kilogram

Table C-16 Toxicity Reference Values for Mammals
AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS	Analyte Surrogate[1]	Test Species	Measured Effect	Toxicity Endpoint	Type	Endpoint Adjustment Uncertainty Factor	Reported Dose (mg/kg-bw/d)	Source	No Effect TRV (mg/kg-bw/day)
Metals	Antimony	7440-36-0	--	Multiple species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	0.059	EPA, 2005a	0.059
Metals	Arsenic	7440-38-2	--	Multiple species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	1.04	EPA, 2005b	1.04
Metals	Beryllium	7440-41-7	--	Multiple species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	0.532	EPA, 2005c	0.532
Metals	Cadmium	7440-43-9	--	Multiple species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	0.77	EPA, 2005d	0.77
Metals	Chromium	7440-47-3	--	Multiple species	Growth and reproduction; Geometric mean of the NOAEL values	NOAEL	Chronic	1	2.4	EPA, 2008b	2.4
Metals	Copper	7440-50-8	--	Multiple species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	5.6	EPA, 2007a	5.6
Metals	Dissolved Antimony	7440-36-0	--	Multiple species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	0.059	EPA, 2005a	0.059
Metals	Dissolved Arsenic	7440-38-2	--	Multiple species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	1.04	EPA, 2005b	1.04
Metals	Dissolved Beryllium	7440-41-7	--	Multiple species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	0.532	EPA, 2005c	0.532
Metals	Dissolved Cadmium	7440-43-9	--	Multiple species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	0.77	EPA, 2005d	0.77
Metals	Dissolved Chromium	7440-47-3	--	Multiple species	Growth and reproduction; Geometric mean of the NOAEL values	NOAEL	Chronic	1	2.4	EPA, 2008b	2.4
Metals	Dissolved Copper	7440-50-8	--	Multiple species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	5.6	EPA, 2007a	5.6
Metals	Dissolved Lead	7439-92-1	--	Multiple species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	4.7	EPA, 2005e	4.7
Metals	Dissolved Mercury	7439-97-6	--	Mink	Reproduction, growth, or survival	NOAEL	Chronic	1	1.41	LANL, 2022	1.41
Metals	Dissolved Molybdenum	7439-98-7	--	Mouse	Reproduction	LOAEL	Chronic	5	2.6	Sample et al. 1996	0.52
Metals	Dissolved Nickel	7440-02-0	--	Multiple species	Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	1.7	EPA, 2007e	1.7
Metals	Dissolved Selenium	7782-49-2	--	Multiple species	Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	0.143	EPA, 2007c	0.143
Metals	Dissolved Silver	7440-22-4	--	Multiple species	Reproduction or growth	NOAEL	Chronic	1	6.02	EPA, 2006	6.02
Metals	Dissolved Thallium	7440-28-0	--	Rat	Growth, reproduction, hair loss	LOAEL	Chronic	5	0.48	LANL, 2022	0.096
Metals	Dissolved Zinc	7440-66-6	--	Multiple species	Growth and reproduction; Geometric mean of the NOAEL values	NOAEL	Chronic	1	75.4	EPA, 2007d	75.4
Metals	Lead	7439-92-1	--	Multiple species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	4.7	EPA, 2005e	4.7
Metals	Mercury	7439-97-6	--	Mink	Reproduction, growth, or survival	NOAEL	Chronic	1	1.41	LANL, 2022	1.41
Metals	Methyl Mercury	22967-92-6	--	Rat	Reproduction and Survival	NOAEL	Chronic	1	0.032	LANL, 2022	0.032
Metals	Molybdenum	7439-98-7	--	Mouse	Reproduction	LOAEL	Chronic	5	2.6	Sample et al. 1996	0.52
Metals	Nickel	7440-02-0	--	Multiple species	Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	1.7	EPA, 2007e	1.7
Metals	Selenium	7782-49-2	--	Multiple species	Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	0.143	EPA, 2007c	0.143
Metals	Silver	7440-22-4	--	Multiple species	Reproduction or growth	NOAEL	Chronic	1	6.02	EPA, 2006	6.02
Metals	Thallium	7440-28-0	--	Rat	Growth, reproduction, hair loss	LOAEL	Chronic	5	0.48	LANL, 2022	0.096
Metals	Zinc	7440-66-6	--	Multiple species	Growth and reproduction; Geometric mean of the NOAEL values	NOAEL	Chronic	1	75.4	EPA, 2007d	75.4
Ammonia	Total Ammonia	7664-41-7	--	--	--	--	--	--	--	--	--
Cyanide	Cyanide, Total	57-12-5	--	Rat	Physiology	BMDL	Subchronic	5	1.9	EPA, 2024	0.38
ACE inhibitor	Enalapril	75847-73-3	--	Mouse	Mortality	LD50	Acute	250	2000	NCBI, 2024	8
Anabolic agent	Androstenedione	63-05-8	--	Rat	Reproduction, decreases estrous cycle length	LOAEL	Chronic	5	60	NCBI, 2024	12
Analgesic	Ibuprofen	15687-27-1	--	Guinea Pig	Mortality, clinical	LD50	Acute	250	495	NCBI, 2024	1.98

Table C-16 Toxicity Reference Values for Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS	Analyte Surrogate[1]	Test Species	Measured Effect	Toxicity Endpoint	Type	Endpoint Adjustment Uncertainty Factor	Reported Dose (mg/kg-bw/d)	Source	No Effect TRV (mg/kg-bw/day)
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	51146-55-5	Ibuprofen	Mouse	Mortality	LD50	Acute	250	1255	NCBI, 2024	5.02
Anti-acid reflux	Ranitidine	66357-35-5	--	--	--	--	--	--	--	--	--
Antiasthmatic	Albuterol	18559-94-9	--	Mouse	Survival	LD50	Acute	250	2000	NOAA, 2024	8
Antiasthmatic	Theophylline	58-55-9	--	Rat	Mortality, clinical effects	LD50	Acute	250	225	NCBI, 2024	0.9
Antibacterial	Penicillin V	87-08-1	--	Mouse	Mortality, clinical	LD50	Acute	250	3500	NCBI, 2024	14
Antibiotic	4-Epitetracycline [ETC]	23313-80-6	Tetracycline	Mouse	Mortality	LD50	Acute	250	1600	NOAA, 2024	6.4
Antibiotic	Enrofloxacin	93106-60-6	--	Rabbit	Mortality	LD50	Acute	250	500	NCBI, 2024	2
Anticonvulsant	Benztropine	86-13-5	--	Mouse	Mortality, seizures	LD50	Acute	250	25	NCBI, 2024	0.1
Anticonvulsant	Carbamazepine	298-46-4	--	Mouse	Mortality	LD50	Acute	250	529	NOAA, 2024	2.116
Antidepressant	10-hydroxy-amitriptyline	1159-82-6	Amitriptyline	--	--	--	--	--	--	--	--
Antidepressant	Amitriptyline	50-48-6	--	Mouse	Mortality	LD50	Acute	250	70	NCBI, 2024	0.28
Antidiabetic drug	Glipizide	29094-61-9	--	--	--	--	--	--	--	--	--
Antidiabetic drug	Glyburide	10238-21-8	--	Mouse	Clinical	LD50	Acute	250	3250	NCBI, 2024	13
Antidiabetic drug	Metformin	657-24-9	--	Mouse	Mortality, clinical	LD50	Acute	250	230	NCBI, 2024	0.92
Antifungal agent	Miconazole	22916-47-8	--	Mouse	Clinical mortality, behavior	LD50	Acute	250	519	NCBI, 2024	2.076
Antihistamine	Diphenhydramine	58-73-1	--	Rat	Mortality	LD50	Acute	250	500	NCBI, 2024	2
Antihistamine	Promethazine	60-87-7	--	Mouse	Mortality	LD50	Acute	250	55	NCBI, 2024	0.22
Antihypertensive	Diltiazem	42399-41-7	--	Mouse	Mortality	LD50	Acute	250	740	NCBI, 2024	2.96
Antihypertensive	Valsartan	137862-53-4	--	--	--	--	--	--	--	--	--
Antihypertensive	Verapamil	52-53-9	--	Rat	Mortality	LD50	Acute	250	114	NOAA, 2024	0.456
Antilipemic	Gemfibrozil	25812-30-0	--	Rat	Hepatotoxicity	LD50	Acute	250	3162	NCBI, 2024	12.648
Antimicrobial, disinfectant	Triclocarban	101-20-2	--	Rat	Mortality	LD50	Acute	250	34600	NCBI, 2024	138.4
Antimicrobial, disinfectant	Triclosan	3380-34-5	--	Baboons	Clinical toxicity (vomiting, diarrhea, failure to eat)	NOAEL	Subchronic	5	30	ORNL, 2025	6
Antipyretic, analgesic	Acetaminophen	103-90-2	--	Rat	Morphology	NOAEL	Chronic	1	66.66	Mossa et al. 2012	66.66
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	611-59-6	--	--	--	--	--	--	--	--	--
Betablocker	Atenolol	29122-68-7	--	Mice	Mortality	LD50	Acute	250	2000	NOAA, 2024	8
Betablocker	Metoprolol	51384-51-1	--	Mouse	Mortality	LD50	Acute	250	1158	NCBI, 2024	4.632
Betablocker	Propranolol	525-66-6	--	Mouse	Autotomic Nervous System	LD50	Acute	250	320	NOAA, 2024	1.28
BloodThinner	Warfarin	81-81-2	--	Rat	Mortality	LD50	Acute	250	1.6	NCBI, 2024	0.0064
ChannelBlocker	Amlodipine	88150-42-9	--	Rat	Reproduction 14 day exposure reduction in litter size and viability.	LOAEL	Chronic	5	10	NCBI, 2024	2
ChannelBlocker	Dehydronifedipine	67035-22-7	--	--	--	--	--	--	--	--	--
ChannelBlocker	Desmethyldiltiazem	42399-41-7	--	--	--	--	--	--	--	--	--
ChannelBlocker	Norverapamil	67018-85-3	Verapamil	Mouse	Mortality	LD50	Acute	250	8	NCBI, 2024	0.032
Cocaine metabolite	Benzoylecgonine	519-09-5	cocaine	Mouse	Mortality, seizures	LD50	Acute	250	95.1	NCBI, 2024	0.3804
Contraceptive	Norgestrel	6533-00-2	--	Rat	Mortality	LD50	Acute	250	5010	NOAA, 2024	20.04
Corticosteroid	Hydrocortisone	50-23-7	--	Rat	Mortality	LD50	Acute	250	150	NCBI, 2024	0.6
Depressant	Alprazolam	28981-97-7	--	Mouse	Mortality	LD50	Acute	250	540	NOAA, 2024	2.16
Depressant	Diazepam	439-14-5	--	Mouse	Physiology, cancer	LD50	Acute	250	278	NOAA, 2024	1.112
Diuretic	Furosemide	54-31-9	--	Rat	Physiology, clinical	LD50	Acute	250	2600	NCBI, 2024	10.4
Diuretic	Hydrochlorothiazide	58-93-5	--	Mouse	Mortality	LD50	Acute	250	3080	NOAA, 2024	12.32
Diuretic	Triamterene	396-01-0	--	Rat	Mortality	LD50	Acute	250	400	NOAA, 2024	1.6
Fungicide and parasiticide	Thiabendazole	148-79-8	--	Mouse	Mortality	LD50	Acute	250	1300	NCBI, 2024	5.2
Glycoside	Digoxin	20830-75-5	--	Mouse	Physiology and behavior	LD50	Acute	250	17.78	NOAA, 2024	0.07112
Lincosamide antibiotic	Lincomycin	154-21-2	--	Rat, juvenile	Survival	LD50	Acute	250	783	NCBI, 2024	3.132
Macrolide antibiotic	Azithromycin	83905-01-5	--	Mouse	Mortality	LD50	Acute	250	3000	NOAA, 2024	12
Macrolide antibiotic	Clarithromycin	81103-11-9	--	Rat	Mortality	LD50	Acute	250	1270	NCBI, 2024	5.08
Macrolide antibiotic	Erythromycin-H2O	114-07-8	--	Mouse	Behavioral, survival,	LD50	Acute	250	2580	NCBI, 2024	10.32
Macrolide antibiotic	Roxithromycin	80214-83-1	--	Dog	Mortality, clinical	LD50	Acute	250	200	NCBI, 2024	0.8
Macrolide antibiotic	Tylosin	1401-69-0	--	Dog	Mortality	LD50	Acute	250	800	NCBI, 2024	3.2
Nicotinemetabolite	Cotinine	486-56-6	--	Rat	BEHAVIORAL: SOMNOLENCE (GENERAL DEPRESSED ACTIVITY); BEHAVIORAL: EXCITEMENT; LUNGS, THORAX, OR RESPIRATION: DYSPNEA	LD50	Acute	250	1604	NCBI, 2024	6.416
Non-steroidalanti-inflammatory drug	Naproxen	22204-53-1	--	Mouse	Mortality	LD50	Acute	250	1234	NOAA, 2024	4.936
Oil & Grease	Oil and Grease, Total (HEM)	--	--	--	--	--	--	--	--	--	--
Opiate	Codeine	76-57-3	--	Rat	Mortality	LD50	Acute	250	427	NCBI, 2024	1.708
Opiate	Hydrocodone	125-29-1	--	Rat	Mortality, Reproduction	LD50	Acute	250	375	NCBI, 2024	1.5
Opiate	Oxycodone	76-42-6	--	Mouse	Mortality, clinical	LD50	Acute	250	320	NCBI, 2024	1.28

Table C-16 Toxicity Reference Values for Mammals
AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS	Analyte Surrogate[1]	Test Species	Measured Effect	Toxicity Endpoint	Type	Endpoint Adjustment Uncertainty Factor	Reported Dose (mg/kg-bw/d)	Source	No Effect TRV (mg/kg-bw/day)
Opiod	Propoxyphene	469-62-5	--	Rat	Mortality, clinical convulsions, repretory distress, seizure	LD50	Acute	250	135	NCBI, 2024	0.54
PCBs	Aroclor 1254	11097-69-1	--	Mink	Reproduction, number of offspring	NOAEL	Chronic	1	0.137	Sample et al. 1996	0.137
PCBs	Aroclor 1260	11096-82-5	Aroclor 1254	Mink	Reproduction, number of offspring	NOAEL	Chronic	1	0.137	Sample et al. 1996	0.137
PDBEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-209)	1163-19-5	--	Multiple Species	Survival, Growth, Biochemistry, cancer	NOAEL	Chronic	1	2.22	EPA, 2008a	2.22
PDBEs	2,2',3,3',4,4',5,6,6'-NoBDE	32534-81-9	--	Rat	Growth, feeding behavior, biochemistry	NOAEL	Chronic	1	0.5	Great Lakes Chem Corp, 2000	0.5
PDBEs	2,2',3,4,4',5,5',6-OcBDE	337513-72-1	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,2',3,4,4',5,6-HpBDE	207122-16-5	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,2',3,4,4',5'-HxBDE	182677-30-1	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,2',3,4,4',6'-HxBDE	243982-83-4	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,2',3,4,4'-PeBDE	182346-21-0	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,2',4,4',5,5'-HxBDE	68631-49-2	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,2',4,4',5,6'-HxBDE	207122-15-4	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,2',4,4',5-PeBDE (BDE-99)	60348-60-9	--	Mice	Neurobehavioral Effects	BMDL	Subchronic	5	0.29	EPA, 2024	0.058
PDBEs	2,2',4,4',6,6'-HxBDE	35854-94-5	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,2',4,4',6-PeBDE	189084-64-8	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,2',4,4'-TeBDE (BDE-47)	5436-43-1	--	Multiple Species	Neurobehavioral Effects	BMDL	Subchronic	5	0.35	EPA, 2024	0.07
PDBEs	2,2',4,5'-TeBDE	243982-82-3	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,2',4,6'-TeBDE	189084-57-9	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,2',4-TriBDE	147217-75-2	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,3',4,4',6-PeBDE	189084-66-0	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,3',4,4'-TeBDE	189084-61-5	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,3',4',6-TeBDE	189084-62-6	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
PDBEs	2,4,4'-TriBDE	41318-75-6	2,2',4,4'-TeBDE	--	--	--	--	--	--	*See Surrogate	0.07
Pesticides	2,4'-DDD	53-19-0	--	Multiple Species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	0.147	EPA, 2007a	0.147
Pesticides	4,4'-DDD	72-54-8	--	Multiple Species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	0.147	EPA, 2007a	0.147
Pesticides	4,4'-DDE	72-55-9	--	Multiple Species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	0.147	EPA, 2007a	0.147
Pesticides	4,4'-DDT	50-29-3	--	Multiple Species	Reproduction, growth, and survival; Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	0.147	EPA, 2007a	0.147
Pesticides	Aldrin	309-00-2	--	Rat	Reproduction, growth, or survival	NOAEL	Chronic	1	0.2	LANL, 2022	0.2
Pesticides	Chlordane, alpha (cis)	5103-71-9	--	Mouse	Hepatic Necrosis	NOAEL	Chronic	1	0.15	EPA, 2024	0.15
Pesticides	Chlorpyriphos	2921-88-2	--	Mice	Reproduction	NOAEL	Chronic	1	0.1	ORNL, 2025	0.1
Pesticides	Chlorpyriphos-Methyl	5598-13-0	Chlorpyrifos	Mice	Reproduction	NOAEL	Chronic	1	0.1	ORNL, 2025	0.1
Pesticides	Cypermethrin	52315-07-8	--	Dog	GI Tract Disturbance	NOAEL	Subchronic	5	1	EPA, 2024	0.2
Pesticides	DEET	134-62-3	--	Multiple Species	Growth	MRL	Chronic	1	1	ATSDR, 2017	1
Pesticides	Demeton-O,S	126-75-0	--	Rat	Optic Nerve Degredation	LOEL	Chronic	5	0.04	EPA, 2024	0.008
Pesticides	Dieldrin	60-57-1	--	Multiple species	Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	0.015	EPA, 2007f	0.015
Pesticides	Endosulfan Sulfate	1031-07-8	--	Rat	Developmental	NOAEL	Subchronic	5	0.29	EPA, 2024b	0.058
Pesticides	Endrin	72-20-8	--	Mouse	Reproduction	LOAEL	Chronic	5	0.92	LANL, 2022	0.184
Pesticides	Endrin Ketone	53494-70-5	Endrine	Mouse	Reproduction	LOAEL	Chronic	5	0.92	LANL, 2022	0.184
Pesticides	HCH, alpha	319-84-6	--	Mouse	Reproduction, growth, or survival	NOAEL	Chronic	1	87	LANL, 2022	87
Pesticides	HCH, beta	319-85-7	--	Rat	Reproduction, growth, or survival	NOAEL	Chronic	1	0.4	LANL, 2022	0.4
Pesticides	HCH, gamma	58-89-9	--	Mink	Reproduction, growth, or survival	NOAEL	Chronic	1	0.014	LANL, 2022	0.014
Pesticides	Heptachlor	76-44-8	--	Mink	Reproduction	LOAEL	Chronic	5	1	LANL, 2022	0.2

Table C-16 Toxicity Reference Values for Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS	Analyte Surrogate[1]	Test Species	Measured Effect	Toxicity Endpoint	Type	Endpoint Adjustment Uncertainty Factor	Reported Dose (mg/kg-bw/d)	Source	No Effect TRV (mg/kg-bw/day)
Pesticides	Hexachlorobenzene	118-74-1	--	Mouse	Mortality	NOAEL	Chronic	1	7.1	LANL, 2022	7.1
Pesticides	Malathion	121-75-5	--	Human , Adult	RBC Depression	NOEL	Subchronic	5	0.23	EPA, 2024	0.046
Pesticides	Methoxychlor	72-43-5	--	Rabbit	Reproduction, litter survival	NOEL	Subchronic	5	5.01	EPA, 2024	1.002
Pesticides	Mirex	2385-85-5	--	Rat	Hepatic, liver effects	NOAEL	Chronic	1	0.07	EPA, 2024	0.07
Pesticides	Permethrin	52645-53-1	--	Rat	Clinical, liver weights	NOAEL	Chronic	1	5	EPA, 2024	5
PFAS	5:3 FTCA	914637-49-3	--	Rats	Systematic Toxicity	LOAEL	Chronic	5	25	DuPont, 2012	5
PFAS	PFBA	375-22-4	--	Mice	Reproduction and growth	NOAEL	Chronic	1	35	Das et al., 2008	35
PFAS	PFHpA	375-85-9	--	--	--	--	--	--	--	--	--
PFAS	PFHxA	307-24-4	--	Mice	Development, postnatal growth	NOAEL	Subchronic	5	100	Iwai and Hoberman, 2014	20
PFAS	PFHxS	355-46-4	--	Mice	Reproduction, survival	BMDL	Chronic	1	5.72	Narizzano and Bohannon, 2021	5.72
PFAS	PFNA	375-95-1	--	Mice	Subchronic effects	NOAEL	Subchronic	5	0.83	Wolf et al., 2010	0.166
PFAS	PFOA	335-67-1	--	Mice	Immunological Effects	BMDL	Chronic	1	1.75	DeWitt et al., 2008	1.75
PFAS	PFOS	1763-23-1	--	Mice	Reproduction, litter survival	BMDL	Chronic	1	0.12	Narizzano and Bohannon, 2021	0.12
PFAS	PFPeA	2706-90-3	--	--	--	--	--	--	--	--	--
PFAS	PFPeS	175905-36-9	--	--	--	--	--	--	--	--	--
Plasticizer	Bisphenol A	80-05-7	--	Rat	Growth	LOAEL	Chronic	5	50	EPA, 2024	10
Plasticizer	Bisphenol S	80-09-1	Bisphenol A	Rat	Growth	LOAEL	Chronic	5	50	EPA, 2024	10
Pyrimidine antibiotic	Trimethoprim	738-70-5	--	Rat	Mortality	LD50	Acute	250	200	NOAA, 2024	0.8
Quinoline antibiotic	Ciprofloxacin	85721-33-1	--	Mouse	Mortality	LD50	Acute	250	1000	NOAA, 2024	4
Quinoline antibiotic	Ofloxacin	82419-36-1	--	Monkey	Mortality, clinical	LD50	Acute	250	500	NCBI, 2024	2
Rubber Stabilizing compound	6PPD-Quinone	2754428-18-5	--	Mice	Mortality	LD50	Acute	250	500	Fang et al., 2023	2
Sex hormone	17 beta-Estradiol	50-28-2	--	Rat	Biochemical Changes in Serum	NOAEL	Chronic	1	0.01	Mathew, M.S. and Devi, 1994	0.01
Sex hormone	Estrone	53-16-7	--	--	--	--	--	--	--	--	--
Sex hormone	Progesterone	57-83-0	--	Human adults	Changes in the uterus	NOAEL	Subchronic	5	3.3	FAO, 1999	0.66
Sex hormone	Testosterone	58-22-0	--	Mouse	Mortality	LD50	Acute	250	430	NCBI, 2024	1.72
SSRI Antidepressant	Fluoxetine	54910-89-3	--	Mouse	Mortality	LD50	Acute	250	284	NCBI, 2024	1.136
SSRI Antidepressant	Norfluoxetine	83891-03-6	--	--	--	--	--	--	--	--	--
SSRI Antidepressant	Paroxetine	61869-08-7	--	--	--	--	--	--	--	--	--
SSRI Antidepressant	Sertraline	79617-96-2	--	--	--	--	--	--	--	--	--
Statin	Atorvastatin	134523-00-5	--	Rats	Male Reproduction sperm viability and health, administered 11 weeks	LOAEL	Chronic	5	100	NCBI, 2024	20
Steroid	Methylprednisolone	83-43-2	--	Rat	Clinical	LD50	Acute	250	2000	NCBI, 2024	8
Steroid	Prednisolone	50-24-8	--	Mouse	Mortality	LD50	Acute	250	1680	EMEA, 2007	6.72
Steroidal Estrogen	Equilenin	517-09-9	--	--	--	--	--	--	--	--	--
Stimulant	Amphetamine	300-62-9	--	Rat	Mortality	LD50	Acute	250	30	NOAA, 2024	0.12
Stimulant	Caffeine	58-08-2	--	Mouse	Mortality	LD50	Acute	250	127	NOAA, 2024	0.508
Stimulant	Cocaine	50-36-2	--	Mouse	Mortality	LD50	Acute	250	99	NCBI, 2024	0.396
Streoid	Prednisone	53-03-2	--	--	--	--	--	--	--	--	--
Sulfonamide antibiotic	Sulfadiazine	68-35-9	--	Mouse	Mortality	LD50	Acute	250	1500	NCBI, 2024	6
Sulfonamide antibiotic	Sulfamethizole	144-82-1	--	Rat	Mortality	LD50	Acute	250	3500	NCBI, 2024	14
Sulfonamide antibiotic	Sulfamethoxazole	723-46-6	--	Mouse	Mortality	LD50	Acute	250	2300	NCBI, 2024	9.2
Sulfonamide antibiotic	Sulfanilamide	63-74-1	--	Mouse	Mortality	LD50	Acute	250	3000	NCBI, 2024	12
SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	--	--	--	--	--	--	--	--	--
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4	LMW-PAHs	Multiple Species	Highest bounded NOAEL below the lowest bounded LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	1-Methylfluorene	1730-37-6	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	1-Methylnaphthalene	90-12-0	2-methylnaphth	Mice	Pulmonary alveolar proteinosis	BMDL	Subchronic	5	4.7	EPA, 2024	0.94
SVOCs/PAHs	1-Methylphenanthrene	832-69-9	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	--	Rat	Reproduction	NOAEL	Chronic	1	3	EPA, 2024b	3
SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6

Table C-16 Toxicity Reference Values for Mammals
AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS	Analyte Surrogate[1]	Test Species	Measured Effect	Toxicity Endpoint	Type	Endpoint Adjustment Uncertainty Factor	Reported Dose (mg/kg-bw/d)	Source	No Effect TRV (mg/kg-bw/day)
SVOCs/PAHs	2-Methylanthracene	613-12-7	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	2-Methylfluoranthene	33543-31-6	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	2-Methylnaphthalene	91-57-6	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	2-Methylphenanthrene	2531-84-2	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	2-Nitrophenol	88-75-5	4-nitrophenol	mouse, rat	Reproduction - growth, progeny counts, viability	NOEL	Chronic	1	400	EPA, 2025	400
SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	3-Methylphenanthrene	832-71-3	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	4-Nitrophenol	100-02-7	--	mouse, rat	Reproduction - growth, progeny counts, viability	NOEL	Chronic	1	400	EPA, 2025	400
SVOCs/PAHs	Acenaphthene	83-32-9	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	Acenaphthylene	208-96-8	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	Anthracene	120-12-7	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	Benz(a)anthracene	56-55-3	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.62
SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.615
SVOCs/PAHs	Benzo(a)pyrene	50-32-8	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.62
SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.62
SVOCs/PAHs	Benzo(b)fluorene	243-17-4	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.615
SVOCs/PAHs	Benzo(e)pyrene	192-97-2	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.615
SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	HMW-PAHs	Multiple Species	Carcinogenic Effects	LOAEL	Chronic	5	72	LANL, 2022	14.4

Table C-16 Toxicity Reference Values for Mammals
AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS	Analyte Surrogate[1]	Test Species	Measured Effect	Toxicity Endpoint	Type	Endpoint Adjustment Uncertainty Factor	Reported Dose (mg/kg-bw/d)	Source	No Effect TRV (mg/kg-bw/day)
SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.615
SVOCs/PAHs	Benzothiophene	95-15-8	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.615
SVOCs/PAHs	Biphenyl	92-52-4	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.615
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	--	Mouse	Survival, growth, or reproduction	NOAEL	Chronic	1	18.3	LANL, 2022	18.3
SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	--	Rat	Growth, physiology	NOAEL	Chronic	1	159	LANL, 2022	159
SVOCs/PAHs	Carbazole	86-74-8	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.615
SVOCs/PAHs	Chrysene/Triphenylene	218-01-9	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.615
SVOCs/PAHs	cis/trans Decalin	493-01-6	--	Rat	Mortality	LD50	Acute	250	4170	NCBI, 2024	16.68
SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	--	Mouse	Cancer, GI effects	LOAEL	Chronic	5	13.3	LANL, 2022	2.66
SVOCs/PAHs	Dibenzofuran	132-64-9	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.615
SVOCs/PAHs	Dibenzothiophene	132-65-0	--	Rat	Increased hepatocyte hypertrophy	NOAEL	Chronic	1	1.04	EPA, 2024b	1.04
SVOCs/PAHs	Diethyl Phthalate	84-66-2	--	Mouse	Reproduction, growth, or survival	NOAEL	Chronic	1	4600	LANL, 2022	4600
SVOCs/PAHs	Dimethyl Phthalate	131-11-3	--	Mouse	Mortality	NOAEL	Chronic	1	68	LANL, 2022	68
SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	--	Mouse	Geomean TRV based on reproduction, growth, survival	NOAEL	Chronic	1	1340	LANL, 2022	1340
SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	--	Rat	Physiological, cytoplasmic vacuolation	NOAEL	Chronic	1	36.8	EPA, 2024	36.8
SVOCs/PAHs	Fluoranthene	206-44-0	--	Mouse	Nephropathy, increased liver weight, clinical effects	NOAEL	Chronic	1	125	EPA, 2024	125
SVOCs/PAHs	Fluorene	86-73-7	--	Mouse	Decreased RBC	NOAEL	Chronic	1	125	EPA, 2024	125
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	--	Rodent	Reproduction, survival, or growth	NOAEL	Chronic	1	7.2	LANL, 2022	7.2
SVOCs/PAHs	Isophorone	78-59-1	--	Dog	Reproduction, survival, organ, behavior	NOEL	Chronic	1	150	EPA, 2024	150
SVOCs/PAHs	Naphthalene	91-20-3	--	Rat	Growth, Decreased Weight	NOAEL	Chronic	1	71	EPA, 2024	71
SVOCs/PAHs	Naphthobenzothiophene	205-43-6	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.615
SVOCs/PAHs	Nitrobenzene	98-95-3	--	Mouse	Mortality	LD50	Chronic	100	590	LANL, 2022	5.9
SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	--	Mouse	Perinatal mortality, sex ratio	LOAEL	Chronic	5	0.025	EPA, 2024b	0.005
SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	--	Multiple Species	Survival, Growth, and reproduction; Geometric mean of NOAELS	NOAEL	Chronic	1	8.42	EPA, 2024	8.42
SVOCs/PAHs	Perylene	198-55-0	HMW-PAHs	Rat, Mouse, Guinea	Reproduction, Growth, or Survival.Highest bounded NOAEL lower than the lowest bounded LOAEL for reproduction, growth or survival - used as TRV for EcoSSL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.615
SVOCs/PAHs	Phenanthrene	85-01-8	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
SVOCs/PAHs	Phenol	108-95-2	--	Rat	Reproduction	NOAEL	Chronic	1	60	LANL, 2022	60
SVOCs/PAHs	Pyrene	129-00-0	HMW-PAHs	Rat, mouse, guinea	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	0.615	EPA, 2007b	0.615

Table C-16 Toxicity Reference Values for Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	CAS	Analyte Surrogate[1]	Test Species	Measured Effect	Toxicity Endpoint	Type	Endpoint Adjustment Uncertainty Factor	Reported Dose (mg/kg-bw/d)	Source	No Effect TRV (mg/kg-bw/day)
SVOCs/PAHs	Retene	483-65-8	LMW-PAHs	Multiple Species	Reproduction, Growth, or Survival, Highest bounded NOAEL lower than the lowest LOAEL	NOAEL	Chronic	1	65.6	EPA, 2007b	65.6
Tetracycline antibiotic	Doxycycline	564-25-0	--	Mouse	Hepatotoxic Effects	LD50	Acute	250	1007.45	NCBI, 2024	4.0298
Tetracycline antibiotic	Tetracycline [TC]	60-54-8	--	Mouse	Mortality	LD50	Acute	250	1600	NOAA, 2024	6.4
Tranquilizer	Meprobamate	57-53-4	--	Rat	Mortality	LD50	Acute	250	750	NCBI, 2024	3
Urinary steroid	Androsterone	53-41-8	--	Rat	Cellular Viability	NOEL	Subchronic	5	1000	Uno et al., 1994	200
VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	--	Mouse	Reproduction, growth, and survival	NOAEL	Chronic	1	999	LANL, 2022	999
VOCs	1,2-Dichloroethane (EDC)	107-06-2	--	Mouse	Survival	NOAEL	Chronic	1	382	LANL, 2022	382
VOCs	1,4-Dichlorobenzene	106-46-7	--	Rat	Growth	NOAEL	Chronic	1	2.5	LANL, 2022	2.5
VOCs	2-Butanone (MEK)	78-93-3	--	Rat	Reproduction	NOAEL	Chronic	1	1771	LANL, 2022	1771
VOCs	2-Hexanone	591-78-6	--	Multiple Species	Survival and growth	NOAEL	Chronic	1	8.27	LANL, 2022	8.27
VOCs	Acetone	67-64-1	--	Rat	Kidney and Liver Toxicity	NOAEL	Subchronic	5	100	Sample et al. 1996	20
VOCs	Acrolein	107-02-8	--	Rat	Survival	NOAEL	Chronic	1	0.05	EPA, 2024	0.05
VOCs	Benzene	71-43-2	--	Mouse	Survival, growth, or reproduction	NOAEL	Chronic	1	26.36	LANL, 2022	26.36
VOCs	Bromodichloromethane	75-27-4	--	Mouse	Growth, kidney lesions	LOAEL	Chronic	5	17.9	EPA, 2024	3.58
VOCs	Bromomethane	74-83-9	--	Rat	Growth, anemia	LOAEL	Subchronic	25	7.1	EPA, 2024	0.284
VOCs	Carbon Disulfide	75-15-0	--	Rabbit	Mortality	NOAEL	Chronic	1	11	EPA, 2024	11
VOCs	Chlorobenzene	108-90-7	--	Dog	Histopathic changes in liver	NOAEL	Chronic	1	19	EPA, 2024	19
VOCs	Chloroethane	75-00-3	--	--	--	--	--	--	--	--	--
VOCs	Chloroform	67-66-3	--	Dog	Fatty Tissue Formation	LOAEL	Chronic	5	12.9	EPA, 2024	2.58
VOCs	Chloromethane	74-87-3	--	Rat	Mortality	LD50	Acute	250	800	OECD, 2002	3.2
VOCs	cis-1,2-Dichloroethene	156-59-2	--	Mouse	Kidney Weight	NOAEL	Subchronic	5	452	Sample et al. 1996	90.4
VOCs	Dichloromethane (Methylene Chloride)	75-09-2	--	Mouse	Liver histology	NOAEL	Chronic	1	5.85	LANL, 2022	5.85
VOCs	Ethylbenzene	100-41-4	--	Rat	Liver and Kidney Toxicity	NOAEL	Chronic	1	97.1	EPA, 2024	97.1
VOCs	m,p-Xylenes	179601-23-1	Xylene (total)	Rat	Survival and Growth	NOAEL	Chronic	1	2.1	LANL, 2022	2.1
VOCs	o-Xylene	95-47-6	Xylene (total)	Rat	Survival and Growth	NOAEL	Chronic	1	2.1	LANL, 2022	2.1
VOCs	Styrene	100-42-5	--	Dog	Red blood cell and liver	NOAEL	Chronic	1	200	EPA, 2024	200
VOCs	Tetrachloroethene (PCE)	127-18-4	--	Rat	Survival, growth, or reproduction	NOAEL	Chronic	1	63	LANL, 2022	63
VOCs	Toluene	108-88-3	--	Mouse	Reproduction	NOAEL	Chronic	1	26	Sample et al. 1996	26
VOCs	Trichloroethene (TCE)	79-01-6	--	Mouse	hepatic toxicity	LOAEL	Subchronic	25	70	Sample et al. 1996	2.8
VOCs	Vinyl Chloride	75-01-4	--	Rat	Survival, growth, or reproduction	NOAEL	Chronic	1	0.17	LANL, 2022	0.17

Notes:

a Uncertainty factors were applied to normalize the endpoints as follows:

Endpoint	Type	To Final Chronic No Effect Level TRV
NOAEL/NOEL/BMDL/MRL	Chronic	1
NOAEL/NOEL/BMDL	Subchronic	5
NOAEL/NOEL	Acute	20
LOAEL/LOEL	Chronic	5
LOAEL/LOEL	Subchronic	25
LOAEL/LOEL	Acute	100
LD50	Chronic	100
LD50	Acute	250

-- not available or not applicable
BMDL = benchmark dose level
EcoSSL = ecological soil screening level
LD50 = lethal dose to 50% of test population
LOAEL = lowest observed adverse effect level
LOEL = lowest observed effect level
mg/kg = milligram(s) per kilogram
mg/kg/d = milligram(s) per kilogram body weight per day
MRL = minimal risk level
NOAEL = no observed adverse effect level
NOEL = no observed effect level
UF = uncertainty factor

Table C-17. Preliminary Screening - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Media	Maximum Detect Effluent (ug/L)	Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	12 Month Site Risk		
				Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		Maximum Detect Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)			No Effect TRV (mg/kg/d)	Screening HQ	Retain for Refined Assessment
										Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4							
Beluga Whale - Modeled Diet from Effluent																						
Metals	Antimony	Max Effluent	0.904	Beluga Whale	1428	0.03	0	1	1	1	0	model	4	1	1	3.62E-03	1.08E-04	0	1.1E-04	0.059	1.84E-03	No
Metals	Arsenic	Max Effluent	3.42	Beluga Whale	1428	0.03	0	1	1	1	0	model	176	1	1	6.02E-01	1.81E-02	0	1.8E-02	1.04	1.74E-02	No
Metals	Beryllium	Max Effluent	0.018	Beluga Whale	1428	0.03	0	1	1	1	0	model	76	1	1	1.37E-03	4.10E-05	0	4.1E-05	0.532	7.71E-05	No
Metals	Cadmium	Max Effluent	0.309	Beluga Whale	1428	0.03	0	1	1	1	0	model	152	1	1	4.70E-02	1.41E-03	0	1.4E-03	0.77	1.83E-03	No
Metals	Chromium	Max Effluent	3.46	Beluga Whale	1428	0.03	0	1	1	1	0	model	64	1	1	2.21E-01	6.64E-03	0	6.6E-03	2.4	2.77E-03	No
Metals	Copper	Max Effluent	115	Beluga Whale	1428	0.03	0	1	1	1	0	model	144	1	1	1.66E+01	4.97E-01	0	5.0E-01	5.6	8.87E-02	No
Metals	Dissolved Antimony	Max Effluent	0.806	Beluga Whale	1428	0.03	0	1	1	1	0	model	4	1	1	3.22E-03	9.67E-05	0	9.7E-05	0.059	1.64E-03	No
Metals	Dissolved Arsenic	Max Effluent	2.78	Beluga Whale	1428	0.03	0	1	1	1	0	model	176	1	1	4.89E-01	1.47E-02	0	1.5E-02	1.04	1.41E-02	No
Metals	Dissolved Beryllium	Max Effluent	0.004	Beluga Whale	1428	0.03	0	1	1	1	0	model	76	1	1	3.04E-04	9.12E-06	0	9.1E-06	0.532	1.71E-05	No
Metals	Dissolved Cadmium	Max Effluent	0.21	Beluga Whale	1428	0.03	0	1	1	1	0	model	152	1	1	3.19E-02	9.58E-04	0	9.6E-04	0.77	1.24E-03	No
Metals	Dissolved Chromium	Max Effluent	3.63	Beluga Whale	1428	0.03	0	1	1	1	0	model	64	1	1	2.32E-01	6.97E-03	0	7.0E-03	2.4	2.90E-03	No
Metals	Dissolved Copper	Max Effluent	41.8	Beluga Whale	1428	0.03	0	1	1	1	0	model	144	1	1	6.02E+00	1.81E-01	0	1.8E-01	5.6	3.22E-02	No
Metals	Dissolved Lead	Max Effluent	1.54	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.95E-02	5.84E-04	0	5.8E-04	4.7	1.24E-04	No
Metals	Dissolved Mercury	Max Effluent	0.0894	Beluga Whale	1428	0.03	0	1	1	1	0	model	25036	2.52	12.6	5.64E+00	1.69E-01	0	1.7E-01	1.41	1.20E-01	No
Metals	Dissolved Molybdenum	Max Effluent	47.6	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	6.02E-01	1.81E-02	0	1.8E-02	0.52	3.47E-02	No
Metals	Dissolved Nickel	Max Effluent	9.49	Beluga Whale	1428	0.03	0	1	1	1	0	model	188	1	1	1.78E+00	5.35E-02	0	5.4E-02	1.7	3.15E-02	No
Metals	Dissolved Selenium	Max Effluent	1	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.26E-02	3.79E-04	0	3.8E-04	0.143	2.65E-03	No
Metals	Dissolved Silver	Max Effluent	0.422	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	5.34E-03	1.60E-04	0	1.6E-04	6.02	2.66E-05	No
Metals	Dissolved Thallium	Max Effluent	0.032	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	4.05E-04	1.21E-05	0	1.2E-05	0.096	1.26E-04	No
Metals	Dissolved Zinc	Max Effluent	124	Beluga Whale	1428	0.03	0	1	1	1	0	model	188	1	1	2.33E+01	6.99E-01	0	7.0E-01	75.4	9.28E-03	No
Metals	Lead	Max Effluent	4.8	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	6.07E-02	1.82E-03	0	1.8E-03	4.7	3.88E-04	No
Metals	Mercury	Max Effluent	0.114	Beluga Whale	1428	0.03	0	1	1	1	0	model	25036	2.52	12.6	7.19E+00	2.16E-01	0	2.2E-01	1.41	1.53E-01	No
Metals	Molybdenum	Max Effluent	48.7	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	6.16E-01	1.85E-02	0	1.8E-02	0.52	3.55E-02	No
Metals	Nickel	Max Effluent	6.7	Beluga Whale	1428	0.03	0	1	1	1	0	model	188	1	1	1.26E+00	3.78E-02	0	3.8E-02	1.7	2.22E-02	No
Metals	Selenium	Max Effluent	1.2	Beluga Whale	1428	0.03	0	1	1	1	0	model	19.52	1	1	2.34E-02	7.03E-04	0	7.0E-04	0.143	4.91E-03	No
Metals	Silver	Max Effluent	0.49	Beluga Whale	1428	0.03	0	1	1	1	0	model	2	1	1	9.80E-04	2.94E-05	0	2.9E-05	6.02	4.88E-06	No
Metals	Thallium	Max Effluent	0.052	Beluga Whale	1428	0.03	0	1	1	1	0	model	464	1	1	2.41E-02	7.24E-04	0	7.2E-04	0.096	7.54E-03	No
Metals	Zinc	Max Effluent	165	Beluga Whale	1428	0.03	0	1	1	1	0	model	188	1	1	3.10E+01	9.31E-01	0	9.3E-01	75.4	1.23E-02	No
Cyanide	Cyanide, Total	Max Effluent	9	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.14E-01	3.41E-03	0	3.4E-03	0.38	8.99E-03	No
ACE inhibitor	Enalapril	Max Effluent	0.0121	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.53E-04	4.59E-06	0	4.6E-06	8	5.74E-07	No
Ammonia	Total Ammonia	Max Effluent	33000	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	4.17E+02	1.25E+01	0	1.3E+01	--	--	Uncertainty
Anabolic agent	Androstenedione	Max Effluent	0.162	Beluga Whale	1428	0.03	0	1	1	1	0	model	121.2	1.028	1.007	2.02E-02	6.06E-04	0	6.1E-04	12	5.05E-05	No
Analgesic	Ibuprofen	Max Effluent	20.9	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1.253	1.072	3.31E-01	9.94E-03	0	9.9E-03	1.98	5.02E-03	No
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	Max Effluent	38.7	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1.01	1.002	4.94E-01	1.48E-02	0	1.5E-02	5.02	2.95E-03	No
Anti-acid reflux	Ranitidine	Max Effluent	0.0844	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.07E-03	3.20E-05	0	3.2E-05	--	--	Uncertainty
Antiasthmatic	Albuterol	Max Effluent	0.0201	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	2.54E-04	7.63E-06	0	7.6E-06	8	9.53E-07	No
Antiasthmatic	Theophylline	Max Effluent	51.1	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	6.46E-01	1.94E-02	0	1.9E-02	0.9	2.15E-02	No
Antibacterial	Penicillin V	Max Effluent	0.0134	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1.005	1	1.70E-04	5.11E-06	0	5.1E-06	14	3.65E-07	No
Antibiotic	4-Epitetracycline [ETC]	Max Effluent	0.0662	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	8.37E-04	2.51E-05	0	2.5E-05	6.4	3.92E-06	No
Antibiotic	Enrofloxacin	Max Effluent	0.000708	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	8.95E-06	2.69E-07	0	2.7E-07	2	1.34E-07	No
Anticonvulsant	Benztropine	Max Effluent	0.00105	Beluga Whale	1428	0.03	0	1	1	1	0	model	1245.2	1.491	1.178	1.95E-03	5.85E-05	0	5.8E-05	0.1	5.85E-04	No
Anticonvulsant	Carbamazepine	Max Effluent	0.506	Beluga Whale	1428	0.03	0	1	1	1	0	model	76.84	1.01	1.002	3.93E-02	1.18E-03	0	1.2E-03	2.116	5.57E-04	No
Antidepressant	10-hydroxy-amitriptyline	Max Effluent	0.0192	Beluga Whale	1428	0.03	0	1	1	1	0	model	330.56	1.067	1.014	6.77E-03	2.03E-04	0	2.0E-04	--	--	Uncertainty
Antidepressant	Amitriptyline	Max Effluent	0.0746	Beluga Whale	1428	0.03	0	1	1	1	0	model	3275.6	2.78	2.193	6.79E-01	2.04E-02	0	2.0E-02	0.28	7.28E-02	No
Antidiabetic drug	Glipizide	Max Effluent	0.0107	Beluga Whale	1428	0.03	0	1	1	1	0	model	33.828	1	1	3.62E-04	1.09E-05	0	1.1E-05	--	--	Uncertainty
Antidiabetic drug	Glyburide	Max Effluent	0.0185	Beluga Whale	1428	0.03	0	1	1	1	0	model	2689.2	2.452	1.871	1.22E-01	3.66E-03	0	3.7E-03	13	2.82E-04	No
Antidiabetic drug	Metformin	Max Effluent	89.3	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.13E+00	3.39E-02	0	3.4E-02	0.92	3.68E-02	No
Antifungal agent	Miconazole	Max Effluent	0.0562	Beluga Whale	1428	0.03	0	1	1	1	0	model	24768	12.691	21.677	1.77E+01	5.30E-01	0	5.3E-01	2.076	2.55E-01	No
Antihistamine	Diphenhydramine	Max Effluent	1.68	Beluga Whale	1428	0.03	0	1	1	1	0	model	267.04	1.053	1.012	4.72E-01	1.42E-02	0	1.4E-02	2	7.09E-03	No
Antihistamine	Promethazine	Max Effluent	0.0335	Beluga Whale	1428	0.03	0	1	1	1	0	model	2771.2	2.452	1.871	2.28E-01	6.83E-03	0	6.8E-03	0.22	3.10E-02	No
Antihypertensive	Diltiazem	Max Effluent	0.406	Beluga Whale	1428	0.03	0	1	1	1	0	model	112.32	1.01	1.002	4.61E-02	1.38E-03	0	1.4E-03	2.96	4.67E-04	No
Antihypertensive	Valsartan	Max Effluent	15.8	Beluga Whale	1428	0.03	0	1	1	1	0	model	400	1.128	1.033	7.13E+00	2.14E-01	0	2.1E-01	--	--	Uncertainty
Antihypertensive	Verapamil	Max Effluent	0.0512	Beluga Whale	1428	0.03	0	1	1	1	0	model	588.4	1.161	1.042	3.50E-02	1.05E-03	0	1.0E-03	0.456	2.30E-03	No
Antilipemic	Gemfibrozil	Max Effluent	1.33	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	2.452	1.871	4.12E-02	1.24E-03	0	1.2E-03	12.648	9.78E-05	No
Antimicrobial, disinfectant	Triclocarban	Max Effluent	0.00489	Beluga Whale	1428	0.03	0	1	1	1	0	model	3186	2.78	2.193	4.33E-02	1.30E-03	0	1.3E-03	138.4	9.39E-06	No
Antimicrobial, disinfectant	Triclosan	Max Effluent	4.31	Beluga Whale	1428	0.03	0	1	1	1	0	model	2568.8	2.452	1.871	2.71E+01	8.14E-01	0	8.1E-01	6	1.36E-01	No
Antipyretic, analgesic	Acetaminophen	Max Effluent	122	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.54E+00	4.63E-02	0	4.6E-02	66.66	6.94E-04	No
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	Max Effluent	57.8	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	7.31E-01	2.19E-02	0	2.2E-02	--	--	Uncertainty
Betablocker	Atenolol	Max Effluent	1.88	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	2.38E-02	7.13E-04	0	7.1E-04	8	8.92E-05	No
Betablocker	Metoprolol	Max Effluent	0.489	Beluga Whale	1428	0.03	0	1	1	1	0	model	17.944	1	1	8.77E-03	2.63E-04	0	2.6E-04	4.632	5.68E-05	No
Betablocker	Propranolol	Max Effluent	0.0748	Beluga Whale	1428	0.03	0	1	1	1	0	model	203.96	1.083	1.019	1.65E-02	4.96E-04	0	5.0E-04	1.28	3.87E-04	No
BloodThinner	Warfarin	Max Effluent	0.00403	Beluga Whale	1428	0.03	0	1	1	1	0	model	112.32	1.01	1.002	4.57E-04	1.37E-05	0	1.4E-05	0.0064	2.14E-03	No
ChannelBlocker	Amlodipine	Max Effluent	0.0248	Beluga Whale	1428	0.03	0	1	1	1	0	model	177.2	1.028	1.007	4.52E-03	1.36E-04	0	1.4E-04	2	6.78E-05	No
ChannelBlocker	Dehydronifedipine	Max Effluent	0.0014	Beluga Whale	1428	0.03	0	1	1	1	0	model	222.96	1.042	1.009	3.25E-04	9.76E-06	0	9.8E-06	--	--	Uncertainty
ChannelBlocker	Desmethyldiltiazem	Max Effluent	0.0836	Beluga Whale	1428	0.03	0	1	1	1	0	model	112.32	1.01	1.002	9.48E-03	2.85E-04	0	2.8E-04	--	--	Uncertainty
ChannelBlocker	Norverapamil	Max Effluent	0.0189	Beluga Whale	1428	0.03	0	1	1	1	0	model	1970.4	1.95	1.459	7.26E-02	2.18E-03	0	2.2E-03	0.032	6.81E-02	No
Cocaine metabolite	Benzoylecgonine	Max Effluent	1.96	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	2.48E-02	7.44E-04	0	7.4E-04	0.3804	1.96E-03	No
Contraceptive	Norgestrel	Max Effluent	0.0818	Beluga Whale	1428	0.03	0	1	1	1	0	model	367.32	1.083	1.019	3.25E-02	9.76E-04	0	9.8E-04	20.04	4.87E-05	No
Corticosteroid	Hydrocortisone	Max Effluent	0.782	Beluga Whale	1428	0.03	0	1	1	1	0	model	21.444	1	1	1.68E-02	5.03E-04	0	5.0E-04	0.6	8.38E-04	No
Depressant	Alprazolam	Max Effluent	0.00323	Beluga Whale	1428	0.03	0	1	1	1	0	model	46.56	1.005	1	1.51E-04	4.53E-06	0	4.5E-06	2.16	2.10E-06	No
Depressant	Diazepam	Max Effluent	0.000827	Beluga Whale	1428	0.03	0	1	1	1	0	model	134.8	1.028	1.007	1.15E-04	3.44E-06	0	3.4E-06	1.112	3.09E-06	No
Diuretic	Furosemide	Max Effluent	0.208	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1.005	1	2.64E-03	7.93E-05	0	7.9E-05	10.4	7.63E-06	No

Table C-17. Preliminary Screening - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Media	Maximum Detect Effluent (ug/L)	Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	12 Month Site Risk		
				Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		Maximum Detect Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				
										Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4					No Effect TRV (mg/kg/d)	Screening HQ	Retain for Refined Assessment
Diuretic	Hydrochlorothiazide	Max Effluent	1.07	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.35E-02	4.06E-04	0	4.1E-04	12.32	3.30E-05	No
Diuretic	Triamterene	Max Effluent	0.0941	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.19E-03	3.57E-05	0	3.6E-05	1.6	2.23E-05	No
Fungicide and parasiticide	Thiabendazole	Max Effluent	0.0306	Beluga Whale	1428	0.03	0	1	1	1	0	model	79.2	1.01	1.002	2.45E-03	7.34E-05	0	7.3E-05	5.2	1.41E-05	No
Glycoside	Digoxin	Max Effluent	0.0701	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.6	1	1	8.83E-04	2.65E-05	0	2.6E-05	0.07112	3.73E-04	No
Lincosamide antibiotic	Lincomycin	Max Effluent	0.0435	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	5.50E-04	1.65E-05	0	1.7E-05	3.132	5.27E-06	No
Macrolide antibiotic	Azithromycin	Max Effluent	0.341	Beluga Whale	1428	0.03	0	1	1	1	0	model	834.4	1.253	1.072	3.57E-01	1.07E-02	0	1.1E-02	12	8.91E-04	No
Macrolide antibiotic	Clarithromycin	Max Effluent	0.165	Beluga Whale	1428	0.03	0	1	1	1	0	model	225.96	1.042	1.009	3.88E-02	1.17E-03	0	1.2E-03	5.08	2.29E-04	No
Macrolide antibiotic	Erythromycin-H2O	Max Effluent	0.168	Beluga Whale	1428	0.03	0	1	1	1	0	model	194.12	1.034	1.007	3.37E-02	1.01E-03	0	1.0E-03	10.32	9.80E-05	No
Macrolide antibiotic	Roxithromycin	Max Effluent	0.000941	Beluga Whale	1428	0.03	0	1	1	1	0	model	121.36	1.028	1.007	1.17E-04	3.52E-06	0	3.5E-06	0.8	4.40E-06	No
Macrolide antibiotic	Tylosin	Max Effluent	0.00143	Beluga Whale	1428	0.03	0	1	1	1	0	model	22.108	1	1	3.16E-05	9.48E-07	0	9.5E-07	3.2	2.96E-07	No
Nicotinemetabolite	Cotinine	Max Effluent	2.8	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	3.54E-02	1.06E-03	0	1.1E-03	6.416	1.66E-04	No
Non-steroidalanti-inflammatory dr	Naproxen	Max Effluent	12.4	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1.042	1.009	1.63E-01	4.90E-03	0	4.9E-03	4.936	9.93E-04	No
Oil & Grease	Oil and Grease, Total (HEM)	Max Effluent	42700	Beluga Whale	1428	0.03	0	1	1	1	0	model	0	0	0	0.00E+00	0.00E+00	0	0.0E+00	--	--	Uncertainty
Opiate	Codeine	Max Effluent	0.152	Beluga Whale	1428	0.03	0	1	1	1	0	model	11.328	1	1	1.72E-03	5.17E-05	0	5.2E-05	1.708	3.02E-05	No
Opiate	Hydrocodone	Max Effluent	0.0687	Beluga Whale	1428	0.03	0	1	1	1	0	model	49.8	1.005	1	3.44E-03	1.03E-04	0	1.0E-04	1.5	6.88E-05	No
Opiate	Oxycodone	Max Effluent	0.16	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	2.02E-03	6.07E-05	0	6.1E-05	1.28	4.74E-05	No
Opiod	Propoxyphene	Max Effluent	0.0102	Beluga Whale	1428	0.03	0	1	1	1	0	model	1064.4	1.38	1.13	1.50E-02	4.49E-04	0	4.5E-04	0.54	8.32E-04	No
PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-2	Max Effluent	0.0258	Beluga Whale	1428	0.03	0	1	1	1	0	model	166.84	1.493	0.226	6.43E-03	1.93E-04	0	1.9E-04	2.22	8.68E-05	No
PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	Max Effluent	0.00524	Beluga Whale	1428	0.03	0	1	1	1	0	model	60560	14.355	26.669	4.56E+00	1.37E-01	0	1.4E-01	0.5	2.73E-01	No
PBDEs	2,2',3,4,4',5,5',6-OcBDE	Max Effluent	0.00141	Beluga Whale	1428	0.03	0	1	1	1	0	model	7728	2.732	0.778	2.98E-02	8.93E-04	0	8.9E-04	0.07	1.28E-02	No
PBDEs	2,2',3,4,4',5',6-HpBDE	Max Effluent	0.000687	Beluga Whale	1428	0.03	0	1	1	1	0	model	3393.2	1.493	0.226	3.48E-03	1.04E-04	0	1.0E-04	0.07	1.49E-03	No
PBDEs	2,2',3,4,4',5'-HxBDE	Max Effluent	0.000494	Beluga Whale	1428	0.03	0	1	1	1	0	model	9264	3.296	1.146	1.51E-02	4.53E-04	0	4.5E-04	0.07	6.46E-03	No
PBDEs	2,2',3,4,4',6'-HxBDE	Max Effluent	0.000154	Beluga Whale	1428	0.03	0	1	1	1	0	model	9264	3.296	1.146	4.70E-03	1.41E-04	0	1.4E-04	0.07	2.02E-03	No
PBDEs	2,2',3,4,4'-PeBDE	Max Effluent	0.00182	Beluga Whale	1428	0.03	0	1	1	1	0	model	25280	10.914	14.388	5.02E-01	1.51E-02	0	1.5E-02	0.07	2.15E-01	No
PBDEs	2,2',4,4',5,5'-HxBDE	Max Effluent	0.0036	Beluga Whale	1428	0.03	0	1	1	1	0	model	9264	3.296	1.146	1.10E-01	3.30E-03	0	3.3E-03	0.07	4.71E-02	No
PBDEs	2,2',4,4',5,6'-HxBDE	Max Effluent	0.00305	Beluga Whale	1428	0.03	0	1	1	1	0	model	9264	3.296	1.146	9.31E-02	2.79E-03	0	2.8E-03	0.07	3.99E-02	No
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	Max Effluent	0.0406	Beluga Whale	1428	0.03	0	1	1	1	0	model	60560	14.355	26.669	3.53E+01	1.06E+00	0	1.1E+00	0.058	1.83E+01	**Yes**
PBDEs	2,2',4,4',6,6'-HxBDE	Max Effluent	0.000213	Beluga Whale	1428	0.03	0	1	1	1	0	model	9264	3.296	1.146	6.50E-03	1.95E-04	0	2.0E-04	0.07	2.79E-03	No
PBDEs	2,2',4,4',6-PeBDE	Max Effluent	0.00811	Beluga Whale	1428	0.03	0	1	1	1	0	model	25280	10.914	14.388	2.24E+00	6.71E-02	0	6.7E-02	0.07	9.59E-01	No
PBDEs	2,2',4,4'-TeBDE (BDE-47)	Max Effluent	0.0432	Beluga Whale	1428	0.03	0	1	1	1	0	model	54400	14.355	26.669	3.37E+01	1.01E+00	0	1.0E+00	0.07	1.45E+01	**Yes**
PBDEs	2,2',4,5'-TeBDE	Max Effluent	0.00156	Beluga Whale	1428	0.03	0	1	1	1	0	model	54400	14.355	26.669	1.22E+00	3.65E-02	0	3.7E-02	0.07	5.22E-01	No
PBDEs	2,2',4,6'-TeBDE	Max Effluent	0.00024	Beluga Whale	1428	0.03	0	1	1	1	0	model	54400	14.355	26.669	1.87E-01	5.62E-03	0	5.6E-03	0.07	8.03E-02	No
PBDEs	2,2',4-TriBDE	Max Effluent	0.00111	Beluga Whale	1428	0.03	0	1	1	1	0	model	14076	9.716	13.964	1.52E-01	4.55E-03	0	4.6E-03	0.07	6.51E-02	No
PBDEs	2,3',4,4',6-PeBDE	Max Effluent	0.000202	Beluga Whale	1428	0.03	0	1	1	1	0	model	25280	10.914	14.388	5.57E-02	1.67E-03	0	1.7E-03	0.07	2.39E-02	No
PBDEs	2,3',4,4'-TeBDE	Max Effluent	0.0015	Beluga Whale	1428	0.03	0	1	1	1	0	model	54400	14.355	26.669	1.17E+00	3.51E-02	0	3.5E-02	0.07	5.02E-01	No
PBDEs	2,3',4',6-TeBDE	Max Effluent	0.000558	Beluga Whale	1428	0.03	0	1	1	1	0	model	54400	14.355	26.669	4.36E-01	1.31E-02	0	1.3E-02	0.07	1.87E-01	No
PBDEs	2,4,4'-TriBDE	Max Effluent	0.00135	Beluga Whale	1428	0.03	0	1	1	1	0	model	14076	9.716	13.964	1.85E-01	5.54E-03	0	5.5E-03	0.07	7.91E-02	No
Pesticides	2,4'-DDD	Max Effluent	0.00107	Beluga Whale	1428	0.03	0	1	1	1	0	model	13944	9.716	13.964	1.45E-01	4.35E-03	0	4.3E-03	0.147	2.96E-02	No
Pesticides	4,4'-DDD	Max Effluent	0.021	Beluga Whale	1428	0.03	0	1	1	1	0	model	17420	10.556	15.996	3.86E+00	1.16E-01	0	1.2E-01	0.147	7.88E-01	No
Pesticides	4,4'-DDE	Max Effluent	0.0047	Beluga Whale	1428	0.03	0	1	1	1	0	model	36672	13.662	24.604	2.35E+00	7.06E-02	0	7.1E-02	0.147	4.81E-01	No
Pesticides	4,4'-DDT	Max Effluent	0.000186	Beluga Whale	1428	0.03	0	1	1	1	0	model	67360	14.388	26.669	1.80E-01	5.41E-03	0	5.4E-03	0.147	3.68E-02	No
Pesticides	Aldrin	Max Effluent	0.0097	Beluga Whale	1428	0.03	0	1	1	1	0	model	36120	13.662	24.604	4.79E+00	1.44E-01	0	1.4E-01	0.2	7.18E-01	No
Pesticides	Chlordane, alpha (cis)	Max Effluent	0.000142	Beluga Whale	1428	0.03	0	1	1	1	0	model	23604	12.064	19.907	4.04E-02	1.21E-03	0	1.2E-03	0.15	8.09E-03	No
Pesticides	Chlorpyriphos	Max Effluent	0.000972	Beluga Whale	1428	0.03	0	1	1	1	0	model	3480.8	3.181	2.612	1.08E-02	3.23E-04	0	3.2E-04	0.1	3.23E-03	No
Pesticides	Chlorpyriphos-Methyl	Max Effluent	0.000211	Beluga Whale	1428	0.03	0	1	1	1	0	model	1296.4	1.491	1.178	4.08E-04	1.22E-05	0	1.2E-05	0.1	1.22E-04	No
Pesticides	Cypermethrin	Max Effluent	0.00405	Beluga Whale	1428	0.03	0	1	1	1	0	model	3881.2	14.388	26.669	2.26E-01	6.78E-03	0	6.8E-03	0.2	3.39E-02	No
Pesticides	DEET	Max Effluent	6.36	Beluga Whale	1428	0.03	0	1	1	1	0	model	51	1.005	1	3.26E-01	9.78E-03	0	9.8E-03	1	9.78E-03	No
Pesticides	Demeton-O,S	Max Effluent	0.038	Beluga Whale	1428	0.03	0	1	1	1	0	model	38.352	1	1	1.46E-03	4.37E-05	0	4.4E-05	0.008	5.47E-03	No
Pesticides	Dieldrin	Max Effluent	0.014	Beluga Whale	1428	0.03	0	1	1	1	0	model	5012	4.188	3.873	2.94E-01	8.82E-03	0	8.8E-03	0.015	5.88E-01	No
Pesticides	Endosulfan Sulfate	Max Effluent	0.022	Beluga Whale	1428	0.03	0	1	1	1	0	model	482.8	1.128	1.033	1.20E-02	3.59E-04	0	3.6E-04	0.058	6.20E-03	No
Pesticides	Endrin	Max Effluent	0.000062	Beluga Whale	1428	0.03	0	1	1	1	0	model	5012	4.188	3.873	1.30E-03	3.90E-05	0	3.9E-05	0.184	2.12E-04	No
Pesticides	Endrin Ketone	Max Effluent	0.0096	Beluga Whale	1428	0.03	0	1	1	1	0	model	3623.2	3.181	2.612	1.11E-01	3.32E-03	0	3.3E-03	0.184	1.80E-02	No
Pesticides	HCH, alpha	Max Effluent	0.000066	Beluga Whale	1428	0.03	0	1	1	1	0	model	1001.6	1.315	1.096	8.69E-05	2.61E-06	0	2.6E-06	87	3.00E-08	No
Pesticides	HCH, beta	Max Effluent	0.000109	Beluga Whale	1428	0.03	0	1	1	1	0	model	1001.6	1.315	1.096	1.44E-04	4.31E-06	0	4.3E-06	0.4	1.08E-05	No
Pesticides	HCH, gamma	Max Effluent	0.000696	Beluga Whale	1428	0.03	0	1	1	1	0	model	1001.6	1.315	1.096	9.17E-04	2.75E-05	0	2.8E-05	0.014	1.96E-03	No
Pesticides	Heptachlor	Max Effluent	0.014	Beluga Whale	1428	0.03	0	1	1	1	0	model	7552	6.266	7.079	6.62E-01	1.99E-02	0	2.0E-02	0.2	9.94E-02	No
Pesticides	Hexachlorobenzene	Max Effluent	0.000517	Beluga Whale	1428	0.03	0	1	1	1	0	model	11212	7.962	10.209	4.62E-02	1.38E-03	0	1.4E-03	7.1	1.95E-04	No
Pesticides	Malathion	Max Effluent	0.52	Beluga Whale	1428	0.03	0	1	1	1	0	model	67	1.01	1.002	3.52E-02	1.06E-03	0	1.1E-03	0.046	2.29E-02	No
Pesticides	Methoxychlor	Max Effluent	0.0029	Beluga Whale	1428	0.03	0	1	1	1	0	model	4176	3.643	3.162	4.41E-02	1.32E-03	0	1.3E-03	1.002	1.32E-03	No
Pesticides	Permethrin	Max Effluent	0.0423	Beluga Whale	1428	0.03	0	1	1	1	0	model	1989.2	13.662	24.604	1.15E+00	3.45E-02	0	3.4E-02	5	6.90E-03	No
PFAS	5:3 FTCA	Max Effluent	0.0592	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1.766	1.334	1.32E-03	3.97E-05	0	4.0E-05	5	7.93E-06	No
PFAS	PFBA	Max Effluent	0.0149	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1.005	1	1.89E-04	5.68E-06	0	5.7E-06	35	1.62E-07	No
PFAS	PFHpA	Max Effluent	0.00847	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1.315	1.096	1.41E-04	4.23E-06	0	4.2E-06	--	--	Uncertainty
PFAS	PFHxA	Max Effluent	0.0255	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1.083	1.019	3.49E-04	1.05E-05	0	1.0E-05	20	5.24E-07	No
PFAS	PFHxS	Max Effluent	0.0396	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1.042	1.009	5.22E-04	1.57E-05	0	1.6E-05	5.72	2.74E-06	No
PFAS	PFNA	Max Effluent	0.00514	Beluga Whale	1428	0.03	0	1	1	1	0	model	40	6.266	7.079	1.29E-03	3.86E-05	0	3.9E-05	0.166	2.33E-04	No
PFAS	PFOA	Max Effluent	0.0185	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	2.452	1.871	5.74E-04	1.72E-05	0	1.7E-05	1.75	9.84E-06	No
PFAS	PFOS	Max Effluent	0.0653	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1.766	1.334	1.46E-03	4.38E-05	0	4.4E-05	0.12	3.65E-04	No
PFAS	PFPeA	Max Effluent	0.0203	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1.028	1.007	2.64E-04	7.92E-06	0	7.9E-06	--	--	Uncertainty
PFAS	PFPeS	Max Effluent	0.00384	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1.01	1.002	4.91E-05	1.47E-06	0	1.5E-06	--	--	Uncertainty
Plasticizer	Bisphenol A	Max Effluent	1.59	Beluga Whale	1428	0.03	0	1	1	1	0	model	288.12	1.053	1.012	4.82E-01	1.45E-02	0	1.4E-02	10	1.45E-03	No
Plasticizer	Bisphenol S	Max Effluent	0.888	Beluga Whale	1428	0.03	0	1	1	1	0	model	22.672	1	1	2.01E-02	6.04E-04	0	6.0E-04	10	6.04E-05	No
Pyrimidine antibiotic	Trimethoprim	Max Effluent	0.711	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	8.99E-03	2.70E-04	0	2.7E-04	0.8	3.37E-04	No

Table C-17. Preliminary Screening - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Media	Maximum Detect Effluent (ug/L)	Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	12 Month Site Risk		
				Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		Maximum Detect Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)			No Effect TRV (mg/kg/d)	Screening HQ	Retain for Refined Assessment
										Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4						
Quinoline antibiotic	Ciprofloxacin	Max Effluent	0.372	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	4.71E-03	1.41E-04	0	1.4E-04	4	3.53E-05	No
Quinoline antibiotic	Ofloxacin	Max Effluent	0.427	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	5.40E-03	1.62E-04	0	1.6E-04	2	8.10E-05	No
Rubber Stabilizing compound	6PPD-Quinone	Max Effluent	0.0053	Beluga Whale	1428	0.03	0	1	1	1	0	model	781.6	1.253	1.072	5.19E-03	1.56E-04	0	1.6E-04	2	7.79E-05	No
Sex hormone	17 beta-Estradiol	Max Effluent	0.00552	Beluga Whale	1428	0.03	0	1	1	1	0	model	822	1.253	1.072	5.69E-03	1.71E-04	0	1.7E-04	0.01	1.71E-02	No
Sex hormone	Estrone	Max Effluent	0.0331	Beluga Whale	1428	0.03	0	1	1	1	0	model	215.88	1.034	1.007	7.39E-03	2.22E-04	0	2.2E-04	--	--	Uncertainty
Sex hormone	Progesterone	Max Effluent	0.0566	Beluga Whale	1428	0.03	0	1	1	1	0	model	664.4	1.202	1.054	4.52E-02	1.36E-03	0	1.4E-03	0.66	2.05E-03	No
Sex hormone	Testosterone	Max Effluent	0.0717	Beluga Whale	1428	0.03	0	1	1	1	0	model	288.12	1.053	1.012	2.18E-02	6.53E-04	0	6.5E-04	1.72	3.79E-04	No
SSRI Antidepressant	Fluoxetine	Max Effluent	0.052	Beluga Whale	1428	0.03	0	1	1	1	0	model	616	1.161	1.042	3.72E-02	1.12E-03	0	1.1E-03	1.136	9.82E-04	No
SSRI Antidepressant	Norfluoxetine	Max Effluent	0.0273	Beluga Whale	1428	0.03	0	1	1	1	0	model	1068	1.38	1.13	4.02E-02	1.21E-03	0	1.2E-03	--	--	Uncertainty
SSRI Antidepressant	Paroxetine	Max Effluent	0.0188	Beluga Whale	1428	0.03	0	1	1	1	0	model	754.4	1.253	1.072	1.78E-02	5.33E-04	0	5.3E-04	--	--	Uncertainty
SSRI Antidepressant	Sertraline	Max Effluent	0.108	Beluga Whale	1428	0.03	0	1	1	1	0	model	5716	4.803	4.742	2.97E+00	8.90E-02	0	8.9E-02	--	--	Uncertainty
Statin	Atorvastatin	Max Effluent	0.22	Beluga Whale	1428	0.03	0	1	1	1	0	model	224.92	13.228	23.281	6.55E-01	1.96E-02	0	2.0E-02	20	9.82E-04	No
Steroid	Methylprednisolone	Max Effluent	0.113	Beluga Whale	1428	0.03	0	1	1	1	0	model	29.396	1	1	3.32E-03	9.97E-05	0	1.0E-04	8	1.25E-05	No
Steroid	Prednisolone	Max Effluent	0.00931	Beluga Whale	1428	0.03	0	1	1	1	0	model	21.772	1	1	2.03E-04	6.08E-06	0	6.1E-06	6.72	9.05E-07	No
Steroidal Estrogen	Equilenin	Max Effluent	0.0134	Beluga Whale	1428	0.03	0	1	1	1	0	model	726.4	1.202	1.054	1.17E-02	3.51E-04	0	3.5E-04	--	--	Uncertainty
Stimulant	Amphetamine	Max Effluent	0.539	Beluga Whale	1428	0.03	0	1	1	1	0	model	26.936	1	1	1.45E-02	4.36E-04	0	4.4E-04	0.12	3.63E-03	No
Stimulant	Caffeine	Max Effluent	105	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.33E+00	3.98E-02	0	4.0E-02	0.508	7.84E-02	No
Stimulant	Cocaine	Max Effluent	0.768	Beluga Whale	1428	0.03	0	1	1	1	0	model	61.16	1.01	1.002	4.74E-02	1.42E-03	0	1.4E-03	0.396	3.59E-03	No
Streoid	Prednisone	Max Effluent	0.404	Beluga Whale	1428	0.03	0	1	1	1	0	model	17.076	1	1	6.90E-03	2.07E-04	0	2.1E-04	--	--	Uncertainty
Sulfonamide antibiotic	Sulfadiazine	Max Effluent	0.00146	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.85E-05	5.54E-07	0	5.5E-07	6	9.23E-08	No
Sulfonamide antibiotic	Sulfamethizole	Max Effluent	0.00511	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	6.46E-05	1.94E-06	0	1.9E-06	14	1.38E-07	No
Sulfonamide antibiotic	Sulfamethoxazole	Max Effluent	1.08	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.37E-02	4.10E-04	0	4.1E-04	9.2	4.45E-05	No
Sulfonamide antibiotic	Sulfanilamide	Max Effluent	0.0348	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	4.40E-04	1.32E-05	0	1.3E-05	12	1.10E-06	No
SVOCs/PAHs	1,2-Diphenylhydrazine	Max Effluent	2.5	Beluga Whale	1428	0.03	0	1	1	1	0	model	161.76	1.028	1.007	4.16E-01	1.25E-02	0	1.2E-02	--	--	Uncertainty
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	Max Effluent	0.1	Beluga Whale	1428	0.03	0	1	1	1	0	model	2775.2	2.452	1.871	6.80E-01	2.04E-02	0	2.0E-02	65.6	3.11E-04	No
SVOCs/PAHs	1-Methyldibenzothiophene	Max Effluent	0.05	Beluga Whale	1428	0.03	0	1	1	1	0	model	2390	2.175	1.633	2.60E-01	7.80E-03	0	7.8E-03	65.6	1.19E-04	No
SVOCs/PAHs	1-Methylfluorene	Max Effluent	0.05	Beluga Whale	1428	0.03	0	1	1	1	0	model	3534	3.181	2.612	5.62E-01	1.69E-02	0	1.7E-02	65.6	2.57E-04	No
SVOCs/PAHs	1-Methylnaphthalene	Max Effluent	0.427	Beluga Whale	1428	0.03	0	1	1	1	0	model	664.4	1.202	1.054	3.41E-01	1.02E-02	0	1.0E-02	0.94	1.09E-02	No
SVOCs/PAHs	1-Methylphenanthrene	Max Effluent	0.0285	Beluga Whale	1428	0.03	0	1	1	1	0	model	19132	3.643	3.162	1.99E+00	5.96E-02	0	6.0E-02	65.6	9.08E-04	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Max Effluent	1.2	Beluga Whale	1428	0.03	0	1	1	1	0	model	505.6	1.128	1.033	6.84E-01	2.05E-02	0	2.1E-02	3	6.84E-03	No
SVOCs/PAHs	2,6-Dimethylnaphthalene	Max Effluent	0.344	Beluga Whale	1428	0.03	0	1	1	1	0	model	1296.4	1.491	1.178	6.65E-01	1.99E-02	0	2.0E-02	65.6	3.04E-04	No
SVOCs/PAHs	2-Methylanthracene	Max Effluent	0.0636	Beluga Whale	1428	0.03	0	1	1	1	0	model	3698.8	3.181	2.612	7.48E-01	2.24E-02	0	2.2E-02	65.6	3.42E-04	No
SVOCs/PAHs	2-Methylfluoranthene	Max Effluent	0.0174	Beluga Whale	1428	0.03	0	1	1	1	0	model	7672	6.266	7.079	8.36E-01	2.51E-02	0	2.5E-02	65.6	3.83E-04	No
SVOCs/PAHs	2-Methylnaphthalene	Max Effluent	0.541	Beluga Whale	1428	0.03	0	1	1	1	0	model	654.4	1.202	1.054	4.26E-01	1.28E-02	0	1.3E-02	65.6	1.95E-04	No
SVOCs/PAHs	2-Methylphenanthrene	Max Effluent	0.0647	Beluga Whale	1428	0.03	0	1	1	1	0	model	13696	2.78	2.193	2.46E+00	7.39E-02	0	7.4E-02	65.6	1.13E-03	No
SVOCs/PAHs	3,6-Dimethylphenanthrene	Max Effluent	0.0189	Beluga Whale	1428	0.03	0	1	1	1	0	model	33036	5.502	5.821	3.44E+00	1.03E-01	0	1.0E-01	65.6	1.57E-03	No
SVOCs/PAHs	3-Methylphenanthrene	Max Effluent	0.0579	Beluga Whale	1428	0.03	0	1	1	1	0	model	13696	2.78	2.193	2.20E+00	6.61E-02	0	6.6E-02	65.6	1.01E-03	No
SVOCs/PAHs	4-Methyldibenzothiophene	Max Effluent	0.0229	Beluga Whale	1428	0.03	0	1	1	1	0	model	2390	2.175	1.633	1.19E-01	3.57E-03	0	3.6E-03	65.6	5.44E-05	No
SVOCs/PAHs	Acenaphthene	Max Effluent	0.0821	Beluga Whale	1428	0.03	0	1	1	1	0	model	716.8	1.202	1.054	7.07E-02	2.12E-03	0	2.1E-03	65.6	3.23E-05	No
SVOCs/PAHs	Acenaphthylene	Max Effluent	0.0125	Beluga Whale	1428	0.03	0	1	1	1	0	model	739.2	1.202	1.054	1.11E-02	3.33E-04	0	3.3E-04	65.6	5.08E-06	No
SVOCs/PAHs	Anthracene	Max Effluent	0.0553	Beluga Whale	1428	0.03	0	1	1	1	0	model	1604	1.766	1.334	1.57E-01	4.70E-03	0	4.7E-03	65.6	7.16E-05	No
SVOCs/PAHs	Benz(a)anthracene	Max Effluent	0.25	Beluga Whale	1428	0.03	0	1	1	1	0	model	11736	8.841	12.05	2.59E+01	7.78E-01	0	7.8E-01	0.62	1.26E+00	**Yes**
SVOCs/PAHs	Benzo(a)fluoranthene	Max Effluent	0.0151	Beluga Whale	1428	0.03	0	1	1	1	0	model	12096	8.841	12.05	1.61E+00	4.84E-02	0	4.8E-02	0.615	7.88E-02	No
SVOCs/PAHs	Benzo(a)pyrene	Max Effluent	0.0563	Beluga Whale	1428	0.03	0	1	1	1	0	model	20588	11.337	17.783	1.31E+01	3.94E-01	0	3.9E-01	0.62	6.36E-01	No
SVOCs/PAHs	Benzo(b)fluoranthene	Max Effluent	0.049	Beluga Whale	1428	0.03	0	1	1	1	0	model	12096	8.841	12.05	5.24E+00	1.57E-01	0	1.6E-01	0.62	2.54E-01	No
SVOCs/PAHs	Benzo(b)fluorene	Max Effluent	0.0406	Beluga Whale	1428	0.03	0	1	1	1	0	model	11916	8.841	12.05	4.28E+00	1.28E-01	0	1.3E-01	0.615	2.09E-01	No
SVOCs/PAHs	Benzo(e)pyrene	Max Effluent	0.0523	Beluga Whale	1428	0.03	0	1	1	1	0	model	32976	13.228	23.281	2.28E+01	6.84E-01	0	6.8E-01	0.615	1.11E+00	**Yes**
SVOCs/PAHs	Benzo(g,h,i)perylene	Max Effluent	0.0833	Beluga Whale	1428	0.03	0	1	1	1	0	model	44000	13.98	25.645	5.12E+01	1.54E+00	0	1.5E+00	14.4	1.07E-01	No
SVOCs/PAHs	Benzo(k,j)fluoranthene	Max Effluent	0.0334	Beluga Whale	1428	0.03	0	1	1	1	0	model	19972	11.337	17.783	7.56E+00	2.27E-01	0	2.3E-01	0.615	3.69E-01	No
SVOCs/PAHs	Benzothiophene	Max Effluent	0.0144	Beluga Whale	1428	0.03	0	1	1	1	0	model	212.64	1.034	1.007	3.17E-03	9.50E-05	0	9.5E-05	0.615	1.54E-04	No
SVOCs/PAHs	Biphenyl	Max Effluent	0.102	Beluga Whale	1428	0.03	0	1	1	1	0	model	822	1.253	1.072	1.05E-01	3.15E-03	0	3.2E-03	0.615	5.12E-03	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Max Effluent	95	Beluga Whale	1428	0.03	0	1	1	1	0	model	6848	11.708	16.749	7.62E+03	2.29E+02	0	2.3E+02	18.3	1.25E+01	**Yes**
SVOCs/PAHs	Butyl Benzyl Phthalate	Max Effluent	5.62	Beluga Whale	1428	0.03	0	1	1	1	0	model	2454.4	2.175	1.633	3.00E+01	9.00E-01	0	9.0E-01	159	5.66E-03	No
SVOCs/PAHs	Carbazole	Max Effluent	0.201	Beluga Whale	1428	0.03	0	1	1	1	0	model	529.2	1.128	1.033	1.20E-01	3.60E-03	0	3.6E-03	0.615	5.85E-03	No
SVOCs/PAHs	Chrysene/Triphenylene	Max Effluent	0.0614	Beluga Whale	1428	0.03	0	1	1	1	0	model	12660	8.841	12.05	6.87E+00	2.06E-01	0	2.1E-01	0.615	3.35E-01	No
SVOCs/PAHs	cis/trans Decalin	Max Effluent	0.484	Beluga Whale	1428	0.03	0	1	1	1	0	model	1091.2	1.38	1.13	7.29E-01	2.19E-02	0	2.2E-02	16.68	1.31E-03	No
SVOCs/PAHs	Dibenzo(a,h)anthracene	Max Effluent	0.00668	Beluga Whale	1428	0.03	0	1	1	1	0	model	38384	13.662	24.604	3.50E+00	1.05E-01	0	1.1E-01	2.66	3.95E-02	No
SVOCs/PAHs	Dibenzofuran	Max Effluent	0.0698	Beluga Whale	1428	0.03	0	1	1	1	0	model	971.6	1.315	1.096	8.92E-02	2.68E-03	0	2.7E-03	0.615	4.35E-03	No
SVOCs/PAHs	Dibenzothiophene	Max Effluent	0.0335	Beluga Whale	1428	0.03	0	1	1	1	0	model	1442	1.614	1.242	7.80E-02	2.34E-03	0	2.3E-03	1.04	2.25E-03	No
SVOCs/PAHs	Diethyl Phthalate	Max Effluent	3.7	Beluga Whale	1428	0.03	0	1	1	1	0	model	73.4	1.01	1.002	2.74E-01	8.23E-03	0	8.2E-03	4600	1.79E-06	No
SVOCs/PAHs	Dimethyl Phthalate	Max Effluent	0.12	Beluga Whale	1428	0.03	0	1	1	1	0	model	21.124	1	1	2.53E-03	7.60E-05	0	7.6E-05	68	1.12E-06	No
SVOCs/PAHs	Di-n-butyl Phthalate	Max Effluent	0.84	Beluga Whale	1428	0.03	0	1	1	1	0	model	1730.4	1.766	1.334	2.57E+00	7.70E-02	0	7.7E-02	1340	5.75E-05	No
SVOCs/PAHs	Di-n-octyl Phthalate	Max Effluent	18.9	Beluga Whale	1428	0.03	0	1	1	1	0	model	3895.6	7.278	6.012	5.36E+02	1.61E+01	0	1.6E+01	36.8	4.37E-01	No
SVOCs/PAHs	Fluoranthene	Max Effluent	0.317	Beluga Whale	1428	0.03	0	1	1	1	0	model	4716	4.188	3.873	6.26E+00	1.88E-01	0	1.9E-01	125	1.50E-03	No
SVOCs/PAHs	Fluorene	Max Effluent	0.126	Beluga Whale	1428	0.03	0	1	1	1	0	model	1064.4	1.38	1.13	1.85E-01	5.55E-03	0	5.6E-03	125	4.44E-05	No
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	Max Effluent	0.0444	Beluga Whale	1428	0.03	0	1	1	1	0	model	48720	14.223	26.363	3.08E+01	9.23E-01	0	9.2E-01	7.2	1.28E-01	No
SVOCs/PAHs	Isophorone	Max Effluent	0.38	Beluga Whale	1428	0.03	0	1	1	1	0	model	24.588	1	1	9.34E-03	2.80E-04	0	2.8E-04	150	1.87E-06	No
SVOCs/PAHs	Naphthalene	Max Effluent	0.98	Beluga Whale	1428	0.03	0	1	1	1	0	model	279.52	1.053	1.012	2.88E-01	8.65E-03	0	8.7E-03	71	1.22E-04	No
SVOCs/PAHs	Naphthobenzothiophene	Max Effluent	0.0337	Beluga Whale	1428	0.03	0	1	1	1	0	model	4936	4.188	3.873	6.97E-01	2.09E-02	0	2.1E-02	0.615	3.40E-02	No
SVOCs/PAHs	N-Nitrosodimethylamine	Max Effluent	9.6	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.21E-01	3.64E-03	0	3.6E-03	0.005	7.29E-01	No
SVOCs/PAHs	Pentachlorophenol (PCP)	Max Effluent	6.3	Beluga Whale	1428	0.03	0	1	1	1	0	model	4440	3.643	3.162	1.02E+02	3.06E+00	0	3.1E+00	8.42	3.63E-01	No
SVOCs/PAHs	Perylene	Max Effluent	0.0333	Beluga Whale	1428	0.03	0	1	1	1	0	model	24708	12.691	21.677	1.04E+01	3.13E-01	0	3.1E-01	0.615	5.09E-01	No
SVOCs/PAHs	Phenanthrene	Max Effluent	0.98	Beluga Whale	1428	0.03	0	1	1	1	0	model	7460	1.766	1.334	1.29E+01	3.87E-01	0	3.9E-01	65.6	5.90E-03	No

Table C-17. Preliminary Screening - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Media	Maximum Detect Effluent (ug/L)	Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	12 Month Site Risk		
				Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		Maximum Detect Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)			No Effect TRV (mg/kg/d)	Screening HQ	Retain for Refined Assessment
										Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4						
SVOCs/PAHs	Phenol	Max Effluent	54.5	Beluga Whale	1428	0.03	0	1	1	1	0	model	17.076	1	1	9.31E-01	2.79E-02	0	2.8E-02	60	4.65E-04	No
SVOCs/PAHs	Pyrene	Max Effluent	0.47	Beluga Whale	1428	0.03	0	1	1	1	0	model	3082.4	2.78	2.193	4.03E+00	1.21E-01	0	1.2E-01	0.615	1.96E-01	No
SVOCs/PAHs	Retene	Max Effluent	0.0108	Beluga Whale	1428	0.03	0	1	1	1	0	model	131400	12.691	21.677	1.80E+01	5.40E-01	0	5.4E-01	65.6	8.24E-03	No
Tetracycline antibiotic	Doxycycline	Max Effluent	0.15	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.90E-03	5.69E-05	0	5.7E-05	4.0298	1.41E-05	No
Tetracycline antibiotic	Tetracycline [TC]	Max Effluent	0.0979	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.24E-03	3.71E-05	0	3.7E-05	6.4	5.80E-06	No
Tranquilizer	Meprobamate	Max Effluent	0.383	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	4.84E-03	1.45E-04	0	1.5E-04	3	4.84E-05	No
Urinary steroid	Androsterone	Max Effluent	0.0571	Beluga Whale	1428	0.03	0	1	1	1	0	model	505.6	1.128	1.033	3.26E-02	9.77E-04	0	9.8E-04	200	4.88E-06	No
VOCs	1,1,1-Trichloroethane (TCA)	Max Effluent	0.79	Beluga Whale	1428	0.03	0	1	1	1	0	model	81.64	1.01	1.002	6.51E-02	1.95E-03	0	2.0E-03	999	1.96E-06	No
VOCs	1,2-Dichloroethane (EDC)	Max Effluent	0.08	Beluga Whale	1428	0.03	0	1	1	1	0	model	17.604	1	1	1.41E-03	4.22E-05	0	4.2E-05	382	1.11E-07	No
VOCs	1,4-Dichlorobenzene	Max Effluent	0.84	Beluga Whale	1428	0.03	0	1	1	1	0	model	345.76	1.067	1.014	3.10E-01	9.30E-03	0	9.3E-03	2.5	3.72E-03	No
VOCs	2-Butanone (MEK)	Max Effluent	68	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	8.60E-01	2.58E-02	0	2.6E-02	1771	1.46E-05	No
VOCs	2-Hexanone	Max Effluent	5.7	Beluga Whale	1428	0.03	0	1	1	1	0	model	15.12	1	1	8.62E-02	2.59E-03	0	2.6E-03	8.27	3.13E-04	No
VOCs	Acetone	Max Effluent	300	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	3.79E+00	1.14E-01	0	1.1E-01	20	5.69E-03	No
VOCs	Acrolein	Max Effluent	1.3	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	1.64E-02	4.93E-04	0	4.9E-04	0.05	9.87E-03	No
VOCs	Benzene	Max Effluent	0.78	Beluga Whale	1428	0.03	0	1	1	1	0	model	47.24	1.005	1	3.70E-02	1.11E-03	0	1.1E-03	26.36	4.21E-05	No
VOCs	Bromodichloromethane	Max Effluent	0.08	Beluga Whale	1428	0.03	0	1	1	1	0	model	38.784	1.005	1	3.12E-03	9.35E-05	0	9.4E-05	3.58	2.61E-05	No
VOCs	Bromomethane	Max Effluent	0.09	Beluga Whale	1428	0.03	0	1	1	1	0	model	11.328	1	1	1.02E-03	3.06E-05	0	3.1E-05	0.284	1.08E-04	No
VOCs	Carbon Disulfide	Max Effluent	0.7	Beluga Whale	1428	0.03	0	1	1	1	0	model	35.404	1	1	2.48E-02	7.43E-04	0	7.4E-04	11	6.76E-05	No
VOCs	Chlorobenzene	Max Effluent	0.08	Beluga Whale	1428	0.03	0	1	1	1	0	model	138.96	1.028	1.007	1.14E-02	3.43E-04	0	3.4E-04	19	1.80E-05	No
VOCs	Chloroethane	Max Effluent	0.69	Beluga Whale	1428	0.03	0	1	1	1	0	model	16.316	1	1	1.13E-02	3.38E-04	0	3.4E-04	--	--	Uncertainty
VOCs	Chloroform	Max Effluent	3.95	Beluga Whale	1428	0.03	0	1	1	1	0	model	37.056	1	1	1.46E-01	4.39E-03	0	4.4E-03	2.58	1.70E-03	No
VOCs	Chloromethane	Max Effluent	1.9	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.648	1	1	2.40E-02	7.21E-04	0	7.2E-04	3.2	2.25E-04	No
VOCs	cis-1,2-Dichloroethene	Max Effluent	0.07	Beluga Whale	1428	0.03	0	1	1	1	0	model	38.784	1.005	1	2.73E-03	8.19E-05	0	8.2E-05	90.4	9.05E-07	No
VOCs	Dichloromethane (Methylene Chlorid	Max Effluent	6.85	Beluga Whale	1428	0.03	0	1	1	1	0	model	12.412	1	1	8.50E-02	2.55E-03	0	2.6E-03	5.85	4.36E-04	No
VOCs	Ethylbenzene	Max Effluent	1.5	Beluga Whale	1428	0.03	0	1	1	1	0	model	222.56	1.042	1.009	3.48E-01	1.04E-02	0	1.0E-02	97.1	1.07E-04	No
VOCs	m,p-Xylenes	Max Effluent	6.2	Beluga Whale	1428	0.03	0	1	1	1	0	model	226	1.042	1.009	1.46E+00	4.38E-02	0	4.4E-02	2.1	2.09E-02	No
VOCs	o-Xylene	Max Effluent	2.6	Beluga Whale	1428	0.03	0	1	1	1	0	model	225.96	1.042	1.009	6.12E-01	1.84E-02	0	1.8E-02	2.1	8.75E-03	No
VOCs	Styrene	Max Effluent	5.5	Beluga Whale	1428	0.03	0	1	1	1	0	model	164.24	1.028	1.007	9.29E-01	2.79E-02	0	2.8E-02	200	1.39E-04	No
VOCs	Tetrachloroethene (PCE)	Max Effluent	0.6	Beluga Whale	1428	0.03	0	1	1	1	0	model	325.36	1.067	1.014	2.08E-01	6.25E-03	0	6.2E-03	63	9.92E-05	No
VOCs	Toluene	Max Effluent	16	Beluga Whale	1428	0.03	0	1	1	1	0	model	117.56	1.01	1.002	1.90E+00	5.70E-02	0	5.7E-02	26	2.19E-03	No
VOCs	Trichloroethene (TCE)	Max Effluent	0.07	Beluga Whale	1428	0.03	0	1	1	1	0	model	73.4	1.01	1.002	5.19E-03	1.56E-04	0	1.6E-04	2.8	5.56E-05	No
VOCs	Vinyl Chloride	Max Effluent	0.02	Beluga Whale	1428	0.03	0	1	1	1	0	model	21.884	1	1	4.38E-04	1.31E-05	0	1.3E-05	0.17	7.72E-05	No
Steller Sea Lion - Modeled Diet from Effluent										1	0											
Metals	Antimony	Max Effluent	0.904	Steller Sea Lion	263	0.08	0	1	1	1	0	model	4	1	1	3.62E-03	2.89E-04	0	2.9E-04	0.059	4.90E-03	No
Metals	Arsenic	Max Effluent	3.42	Steller Sea Lion	263	0.08	0	1	1	1	0	model	176	1	1	6.02E-01	4.82E-02	0	4.8E-02	1.04	4.63E-02	No
Metals	Beryllium	Max Effluent	0.018	Steller Sea Lion	263	0.08	0	1	1	1	0	model	76	1	1	1.37E-03	1.09E-04	0	1.1E-04	0.532	2.06E-04	No
Metals	Cadmium	Max Effluent	0.309	Steller Sea Lion	263	0.08	0	1	1	1	0	model	152	1	1	4.70E-02	3.76E-03	0	3.8E-03	0.77	4.88E-03	No
Metals	Chromium	Max Effluent	3.46	Steller Sea Lion	263	0.08	0	1	1	1	0	model	64	1	1	2.21E-01	1.77E-02	0	1.8E-02	2.4	7.38E-03	No
Metals	Copper	Max Effluent	115	Steller Sea Lion	263	0.08	0	1	1	1	0	model	144	1	1	1.66E+01	1.32E+00	0	1.3E+00	5.6	2.37E-01	No
Metals	Dissolved Antimony	Max Effluent	0.806	Steller Sea Lion	263	0.08	0	1	1	1	0	model	4	1	1	3.22E-03	2.58E-04	0	2.6E-04	0.059	4.37E-03	No
Metals	Dissolved Arsenic	Max Effluent	2.78	Steller Sea Lion	263	0.08	0	1	1	1	0	model	176	1	1	4.89E-01	3.91E-02	0	3.9E-02	1.04	3.76E-02	No
Metals	Dissolved Beryllium	Max Effluent	0.004	Steller Sea Lion	263	0.08	0	1	1	1	0	model	76	1	1	3.04E-04	2.43E-05	0	2.4E-05	0.532	4.57E-05	No
Metals	Dissolved Cadmium	Max Effluent	0.21	Steller Sea Lion	263	0.08	0	1	1	1	0	model	152	1	1	3.19E-02	2.55E-03	0	2.6E-03	0.77	3.32E-03	No
Metals	Dissolved Chromium	Max Effluent	3.63	Steller Sea Lion	263	0.08	0	1	1	1	0	model	64	1	1	2.32E-01	1.86E-02	0	1.9E-02	2.4	7.74E-03	No
Metals	Dissolved Copper	Max Effluent	41.8	Steller Sea Lion	263	0.08	0	1	1	1	0	model	144	1	1	6.02E+00	4.82E-01	0	4.8E-01	5.6	8.60E-02	No
Metals	Dissolved Lead	Max Effluent	1.54	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.95E-02	1.56E-03	0	1.6E-03	4.7	3.32E-04	No
Metals	Dissolved Mercury	Max Effluent	0.0894	Steller Sea Lion	263	0.08	0	1	1	1	0	model	25036	2.52	12.6	5.64E+00	4.51E-01	0	4.5E-01	1.41	3.20E-01	No
Metals	Dissolved Molybdenum	Max Effluent	47.6	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	6.02E-01	4.82E-02	0	4.8E-02	0.52	9.26E-02	No
Metals	Dissolved Nickel	Max Effluent	9.49	Steller Sea Lion	263	0.08	0	1	1	1	0	model	188	1	1	1.78E+00	1.43E-01	0	1.4E-01	1.7	8.40E-02	No
Metals	Dissolved Selenium	Max Effluent	1	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.26E-02	1.01E-03	0	1.0E-03	0.143	7.08E-03	No
Metals	Dissolved Silver	Max Effluent	0.422	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	5.34E-03	4.27E-04	0	4.3E-04	6.02	7.09E-05	No
Metals	Dissolved Thallium	Max Effluent	0.032	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	4.05E-04	3.24E-05	0	3.2E-05	0.096	3.37E-04	No
Metals	Dissolved Zinc	Max Effluent	124	Steller Sea Lion	263	0.08	0	1	1	1	0	model	188	1	1	2.33E+01	1.86E+00	0	1.9E+00	75.4	2.47E-02	No
Metals	Lead	Max Effluent	4.8	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	6.07E-02	4.86E-03	0	4.9E-03	4.7	1.03E-03	No
Metals	Mercury	Max Effluent	0.114	Steller Sea Lion	263	0.08	0	1	1	1	0	model	25036	2.52	12.6	7.19E+00	5.75E-01	0	5.8E-01	1.41	4.08E-01	No
Metals	Molybdenum	Max Effluent	48.7	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	6.16E-01	4.93E-02	0	4.9E-02	0.52	9.48E-02	No
Metals	Nickel	Max Effluent	6.7	Steller Sea Lion	263	0.08	0	1	1	1	0	model	188	1	1	1.26E+00	1.01E-01	0	1.0E-01	1.7	5.93E-02	No
Metals	Selenium	Max Effluent	1.2	Steller Sea Lion	263	0.08	0	1	1	1	0	model	19.52	1	1	2.34E-02	1.87E-03	0	1.9E-03	0.143	1.31E-02	No
Metals	Silver	Max Effluent	0.49	Steller Sea Lion	263	0.08	0	1	1	1	0	model	2	1	1	9.80E-04	7.84E-05	0	7.8E-05	6.02	1.30E-05	No
Metals	Thallium	Max Effluent	0.052	Steller Sea Lion	263	0.08	0	1	1	1	0	model	464	1	1	2.41E-02	1.93E-03	0	1.9E-03	0.096	2.01E-02	No
Metals	Zinc	Max Effluent	165	Steller Sea Lion	263	0.08	0	1	1	1	0	model	188	1	1	3.10E+01	2.48E+00	0	2.5E+00	75.4	3.29E-02	No
Cyanide	Cyanide, Total	Max Effluent	9	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.14E-01	9.11E-03	0	9.1E-03	0.38	2.40E-02	No
ACE inhibitor	Enalapril	Max Effluent	0.0121	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.53E-04	1.22E-05	0	1.2E-05	8	1.53E-06	No
Ammonia	Total Ammonia	Max Effluent	33000	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	4.17E+02	3.34E+01	0	3.3E+01	--	--	Uncertainty
Anabolic agent	Androstenedione	Max Effluent	0.162	Steller Sea Lion	263	0.08	0	1	1	1	0	model	121.2	1.028	1.007	2.02E-02	1.61E-03	0	1.6E-03	12	1.35E-04	No
Analgesic	Ibuprofen	Max Effluent	20.9	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1.253	1.072	3.31E-01	2.65E-02	0	2.6E-02	1.98	1.34E-02	No
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	Max Effluent	38.7	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1.01	1.002	4.94E-01	3.95E-02	0	4.0E-02	5.02	7.88E-03	No
Anti-acid reflux	Ranitidine	Max Effluent	0.0844	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.07E-03	8.54E-05	0	8.5E-05	--	--	Uncertainty
Antiasthmatic	Albuterol	Max Effluent	0.0201	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	2.54E-04	2.03E-05	0	2.0E-05	8	2.54E-06	No
Antiasthmatic	Theophylline	Max Effluent	51.1	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	6.46E-01	5.17E-02	0	5.2E-02	0.9	5.75E-02	No
Antibacterial	Penicillin V	Max Effluent	0.0134	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1.005	1	1.70E-04	1.36E-05	0	1.4E-05	14	9.73E-07	No
Antibiotic	4-Epitetracycline [ETC]	Max Effluent	0.0662	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	8.37E-04	6.70E-05	0	6.7E-05	6.4	1.05E-05	No
Antibiotic	Enrofloxacin	Max Effluent	0.000708	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	8.95E-06	7.16E-07	0	7.2E-07	2	3.58E-07	No

Table C-17. Preliminary Screening - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Media	Maximum Detect Effluent (ug/L)	Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	12 Month Site Risk		
				Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		Maximum Detect Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				
										Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4					No Effect TRV (mg/kg/d)	Screening HQ	Retain for Refined Assessment
Anticonvulsant	Benztropine	Max Effluent	0.00105	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1245.2	1.491	1.178	1.95E-03	1.56E-04	0	1.6E-04	0.1	1.56E-03	No
Anticonvulsant	Carbamazepine	Max Effluent	0.506	Steller Sea Lion	263	0.08	0	1	1	1	0	model	76.84	1.01	1.002	3.93E-02	3.14E-03	0	3.1E-03	2.116	1.48E-03	No
Antidepressant	10-hydroxy-amitriptyline	Max Effluent	0.0192	Steller Sea Lion	263	0.08	0	1	1	1	0	model	330.56	1.067	1.014	6.77E-03	5.42E-04	0	5.4E-04	--	--	Uncertainty
Antidepressant	Amitriptyline	Max Effluent	0.0746	Steller Sea Lion	263	0.08	0	1	1	1	0	model	3275.6	2.78	2.193	6.79E-01	5.43E-02	0	5.4E-02	0.28	1.94E-01	No
Antidiabetic drug	Glipizide	Max Effluent	0.0107	Steller Sea Lion	263	0.08	0	1	1	1	0	model	33.828	1	1	3.62E-04	2.90E-05	0	2.9E-05	--	--	Uncertainty
Antidiabetic drug	Glyburide	Max Effluent	0.0185	Steller Sea Lion	263	0.08	0	1	1	1	0	model	2689.2	2.452	1.871	1.22E-01	9.76E-03	0	9.8E-03	13	7.51E-04	No
Antidiabetic drug	Metformin	Max Effluent	89.3	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.13E+00	9.04E-02	0	9.0E-02	0.92	9.82E-02	No
Antifungal agent	Miconazole	Max Effluent	0.0562	Steller Sea Lion	263	0.08	0	1	1	1	0	model	24768	12.691	21.677	1.77E+01	1.41E+00	0	1.4E+00	2.076	6.81E-01	No
Antihistamine	Diphenhydramine	Max Effluent	1.68	Steller Sea Lion	263	0.08	0	1	1	1	0	model	267.04	1.053	1.012	4.72E-01	3.78E-02	0	3.8E-02	2	1.89E-02	No
Antihistamine	Promethazine	Max Effluent	0.0335	Steller Sea Lion	263	0.08	0	1	1	1	0	model	2771.2	2.452	1.871	2.28E-01	1.82E-02	0	1.8E-02	0.22	8.28E-02	No
Antihypertensive	Diltiazem	Max Effluent	0.406	Steller Sea Lion	263	0.08	0	1	1	1	0	model	112.32	1.01	1.002	4.61E-02	3.68E-03	0	3.7E-03	2.96	1.24E-03	No
Antihypertensive	Valsartan	Max Effluent	15.8	Steller Sea Lion	263	0.08	0	1	1	1	0	model	400	1.128	1.033	7.13E+00	5.70E-01	0	5.7E-01	--	--	Uncertainty
Antihypertensive	Verapamil	Max Effluent	0.0512	Steller Sea Lion	263	0.08	0	1	1	1	0	model	588.4	1.161	1.042	3.50E-02	2.80E-03	0	2.8E-03	0.456	6.14E-03	No
Antilipemic	Gemfibrozil	Max Effluent	1.33	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	2.452	1.871	4.12E-02	3.30E-03	0	3.3E-03	12.648	2.61E-04	No
Antimicrobial, disinfectant	Triclocarban	Max Effluent	0.00489	Steller Sea Lion	263	0.08	0	1	1	1	0	model	3186	2.78	2.193	4.33E-02	3.46E-03	0	3.5E-03	138.4	2.50E-05	No
Antimicrobial, disinfectant	Triclosan	Max Effluent	4.31	Steller Sea Lion	263	0.08	0	1	1	1	0	model	2568.8	2.452	1.871	2.71E+01	2.17E+00	0	2.2E+00	6	3.62E-01	No
Antipyretic, analgesic	Acetaminophen	Max Effluent	122	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.54E+00	1.23E-01	0	1.2E-01	66.66	1.85E-03	No
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	Max Effluent	57.8	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	7.31E-01	5.85E-02	0	5.8E-02	--	--	Uncertainty
Betablocker	Atenolol	Max Effluent	1.88	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	2.38E-02	1.90E-03	0	1.9E-03	8	2.38E-04	No
Betablocker	Metoprolol	Max Effluent	0.489	Steller Sea Lion	263	0.08	0	1	1	1	0	model	17.944	1	1	8.77E-03	7.02E-04	0	7.0E-04	4.632	1.52E-04	No
Betablocker	Propranolol	Max Effluent	0.0748	Steller Sea Lion	263	0.08	0	1	1	1	0	model	203.96	1.083	1.019	1.65E-02	1.32E-03	0	1.3E-03	1.28	1.03E-03	No
BloodThinner	Warfarin	Max Effluent	0.00403	Steller Sea Lion	263	0.08	0	1	1	1	0	model	112.32	1.01	1.002	4.57E-04	3.66E-05	0	3.7E-05	0.0064	5.71E-03	No
ChannelBlocker	Amlodipine	Max Effluent	0.0248	Steller Sea Lion	263	0.08	0	1	1	1	0	model	177.2	1.028	1.007	4.52E-03	3.61E-04	0	3.6E-04	2	1.81E-04	No
ChannelBlocker	Dehydronifedipine	Max Effluent	0.0014	Steller Sea Lion	263	0.08	0	1	1	1	0	model	222.96	1.042	1.009	3.25E-04	2.60E-05	0	2.6E-05	--	--	Uncertainty
ChannelBlocker	Desmethyldiltiazem	Max Effluent	0.0836	Steller Sea Lion	263	0.08	0	1	1	1	0	model	112.32	1.01	1.002	9.48E-03	7.59E-04	0	7.6E-04	--	--	Uncertainty
ChannelBlocker	Norverapamil	Max Effluent	0.0189	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1970.4	1.95	1.459	7.26E-02	5.81E-03	0	5.8E-03	0.032	1.82E-01	No
Cocaine metabolite	Benzoylecgonine	Max Effluent	1.96	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	2.48E-02	1.98E-03	0	2.0E-03	0.3804	5.21E-03	No
Contraceptive	Norgestrel	Max Effluent	0.0818	Steller Sea Lion	263	0.08	0	1	1	1	0	model	367.32	1.083	1.019	3.25E-02	2.60E-03	0	2.6E-03	20.04	1.30E-04	No
Corticosteroid	Hydrocortisone	Max Effluent	0.782	Steller Sea Lion	263	0.08	0	1	1	1	0	model	21.444	1	1	1.68E-02	1.34E-03	0	1.3E-03	0.6	2.24E-03	No
Depressant	Alprazolam	Max Effluent	0.00323	Steller Sea Lion	263	0.08	0	1	1	1	0	model	46.56	1.005	1	1.51E-04	1.21E-05	0	1.2E-05	2.16	5.60E-06	No
Depressant	Diazepam	Max Effluent	0.000827	Steller Sea Lion	263	0.08	0	1	1	1	0	model	134.8	1.028	1.007	1.15E-04	9.17E-06	0	9.2E-06	1.112	8.24E-06	No
Diuretic	Furosemide	Max Effluent	0.208	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1.005	1	2.64E-03	2.12E-04	0	2.1E-04	10.4	2.03E-05	No
Diuretic	Hydrochlorothiazide	Max Effluent	1.07	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.35E-02	1.08E-03	0	1.1E-03	12.32	8.79E-05	No
Diuretic	Triamterene	Max Effluent	0.0941	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.19E-03	9.52E-05	0	9.5E-05	1.6	5.95E-05	No
Fungicide and parasiticide	Thiabendazole	Max Effluent	0.0306	Steller Sea Lion	263	0.08	0	1	1	1	0	model	79.2	1.01	1.002	2.45E-03	1.96E-04	0	2.0E-04	5.2	3.77E-05	No
Glycoside	Digoxin	Max Effluent	0.0701	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.6	1	1	8.83E-04	7.07E-05	0	7.1E-05	0.07112	9.94E-04	No
Lincosamide antibiotic	Lincomycin	Max Effluent	0.0435	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	5.50E-04	4.40E-05	0	4.4E-05	3.132	1.41E-05	No
Macrolide antibiotic	Azithromycin	Max Effluent	0.341	Steller Sea Lion	263	0.08	0	1	1	1	0	model	834.4	1.253	1.072	3.57E-01	2.85E-02	0	2.9E-02	12	2.38E-03	No
Macrolide antibiotic	Clarithromycin	Max Effluent	0.165	Steller Sea Lion	263	0.08	0	1	1	1	0	model	225.96	1.042	1.009	3.88E-02	3.11E-03	0	3.1E-03	5.08	6.12E-04	No
Macrolide antibiotic	Erythromycin-H2O	Max Effluent	0.168	Steller Sea Lion	263	0.08	0	1	1	1	0	model	194.12	1.034	1.007	3.37E-02	2.70E-03	0	2.7E-03	10.32	2.61E-04	No
Macrolide antibiotic	Roxithromycin	Max Effluent	0.000941	Steller Sea Lion	263	0.08	0	1	1	1	0	model	121.36	1.028	1.007	1.17E-04	9.39E-06	0	9.4E-06	0.8	1.17E-05	No
Macrolide antibiotic	Tylosin	Max Effluent	0.00143	Steller Sea Lion	263	0.08	0	1	1	1	0	model	22.108	1	1	3.16E-05	2.53E-06	0	2.5E-06	3.2	7.90E-07	No
Nicotinemetabolite	Cotinine	Max Effluent	2.8	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	3.54E-02	2.83E-03	0	2.8E-03	6.416	4.42E-04	No
Non-steroidalanti-inflammatory dr	Naproxen	Max Effluent	12.4	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1.042	1.009	1.63E-01	1.31E-02	0	1.3E-02	4.936	2.65E-03	No
Oil & Grease	Oil and Grease, Total (HEM)	Max Effluent	42700	Steller Sea Lion	263	0.08	0	1	1	1	0	model	0	0	0	0.00E+00	0.00E+00	0	0.0E+00	--	--	Uncertainty
Opiate	Codeine	Max Effluent	0.152	Steller Sea Lion	263	0.08	0	1	1	1	0	model	11.328	1	1	1.72E-03	1.38E-04	0	1.4E-04	1.708	8.06E-05	No
Opiate	Hydrocodone	Max Effluent	0.0687	Steller Sea Lion	263	0.08	0	1	1	1	0	model	49.8	1.005	1	3.44E-03	2.75E-04	0	2.8E-04	1.5	1.83E-04	No
Opiate	Oxycodone	Max Effluent	0.16	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	2.02E-03	1.62E-04	0	1.6E-04	1.28	1.26E-04	No
Opiod	Propoxyphene	Max Effluent	0.0102	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1064.4	1.38	1.13	1.50E-02	1.20E-03	0	1.2E-03	0.54	2.22E-03	No
PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-2	Max Effluent	0.0258	Steller Sea Lion	263	0.08	0	1	1	1	0	model	166.84	1.493	0.226	6.43E-03	5.14E-04	0	5.1E-04	2.22	2.32E-04	No
PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	Max Effluent	0.00524	Steller Sea Lion	263	0.08	0	1	1	1	0	model	60560	14.355	26.669	4.56E+00	3.64E-01	0	3.6E-01	0.5	7.29E-01	No
PBDEs	2,2',3,4,4',5,5',6-OcBDE	Max Effluent	0.00141	Steller Sea Lion	263	0.08	0	1	1	1	0	model	7728	2.732	0.778	2.98E-02	2.38E-03	0	2.4E-03	0.07	3.40E-02	No
PBDEs	2,2',3,4,4',5',6-HpBDE	Max Effluent	0.000687	Steller Sea Lion	263	0.08	0	1	1	1	0	model	3393.2	1.493	0.226	3.48E-03	2.78E-04	0	2.8E-04	0.07	3.98E-03	No
PBDEs	2,2',3,4,4',5'-HxBDE	Max Effluent	0.000494	Steller Sea Lion	263	0.08	0	1	1	1	0	model	9264	3.296	1.146	1.51E-02	1.21E-03	0	1.2E-03	0.07	1.72E-02	No
PBDEs	2,2',3,4,4',6'-HxBDE	Max Effluent	0.000154	Steller Sea Lion	263	0.08	0	1	1	1	0	model	9264	3.296	1.146	4.70E-03	3.76E-04	0	3.8E-04	0.07	5.37E-03	No
PBDEs	2,2',3,4,4'-PeBDE	Max Effluent	0.00182	Steller Sea Lion	263	0.08	0	1	1	1	0	model	25280	10.914	14.388	5.02E-01	4.02E-02	0	4.0E-02	0.07	5.74E-01	No
PBDEs	2,2',4,4',5,5'-HxBDE	Max Effluent	0.0036	Steller Sea Lion	263	0.08	0	1	1	1	0	model	9264	3.296	1.146	1.10E-01	8.79E-03	0	8.8E-03	0.07	1.26E-01	No
PBDEs	2,2',4,4',5,6'-HxBDE	Max Effluent	0.00305	Steller Sea Lion	263	0.08	0	1	1	1	0	model	9264	3.296	1.146	9.31E-02	7.45E-03	0	7.5E-03	0.07	1.06E-01	No
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	Max Effluent	0.0406	Steller Sea Lion	263	0.08	0	1	1	1	0	model	60560	14.355	26.669	3.53E+01	2.82E+00	0	2.8E+00	0.058	4.87E+01	**Yes**
PBDEs	2,2',4,4',6,6'-HxBDE	Max Effluent	0.000213	Steller Sea Lion	263	0.08	0	1	1	1	0	model	9264	3.296	1.146	6.50E-03	5.20E-04	0	5.2E-04	0.07	7.43E-03	No
PBDEs	2,2',4,4',6-PeBDE	Max Effluent	0.00811	Steller Sea Lion	263	0.08	0	1	1	1	0	model	25280	10.914	14.388	2.24E+00	1.79E-01	0	1.8E-01	0.07	2.56E+00	**Yes**
PBDEs	2,2',4,4'-TeBDE (BDE-47)	Max Effluent	0.0432	Steller Sea Lion	263	0.08	0	1	1	1	0	model	54400	14.355	26.669	3.37E+01	2.70E+00	0	2.7E+00	0.07	3.86E+01	**Yes**
PBDEs	2,2',4,5'-TeBDE	Max Effluent	0.00156	Steller Sea Lion	263	0.08	0	1	1	1	0	model	54400	14.355	26.669	1.22E+00	9.75E-02	0	9.7E-02	0.07	1.39E+00	**Yes**
PBDEs	2,2',4,6'-TeBDE	Max Effluent	0.00024	Steller Sea Lion	263	0.08	0	1	1	1	0	model	54400	14.355	26.669	1.87E-01	1.50E-02	0	1.5E-02	0.07	2.14E-01	No
PBDEs	2,2',4-TriBDE	Max Effluent	0.00111	Steller Sea Lion	263	0.08	0	1	1	1	0	model	14076	9.716	13.964	1.52E-01	1.21E-02	0	1.2E-02	0.07	1.73E-01	No
PBDEs	2,3',4,4',6-PeBDE	Max Effluent	0.000202	Steller Sea Lion	263	0.08	0	1	1	1	0	model	25280	10.914	14.388	5.57E-02	4.46E-03	0	4.5E-03	0.07	6.37E-02	No
PBDEs	2,3',4,4'-TeBDE	Max Effluent	0.0015	Steller Sea Lion	263	0.08	0	1	1	1	0	model	54400	14.355	26.669	1.17E+00	9.37E-02	0	9.4E-02	0.07	1.34E+00	**Yes**
PBDEs	2,3',4',6-TeBDE	Max Effluent	0.000558	Steller Sea Lion	263	0.08	0	1	1	1	0	model	54400	14.355	26.669	4.36E-01	3.49E-02	0	3.5E-02	0.07	4.98E-01	No
PBDEs	2,4,4'-TriBDE	Max Effluent	0.00135	Steller Sea Lion	263	0.08	0	1	1	1	0	model	14076	9.716	13.964	1.85E-01	1.48E-02	0	1.5E-02	0.07	2.11E-01	No
Pesticides	2,4'-DDD	Max Effluent	0.00107	Steller Sea Lion	263	0.08	0	1	1	1	0	model	13944	9.716	13.964	1.45E-01	1.16E-02	0	1.2E-02	0.147	7.89E-02	No
Pesticides	4,4'-DDD	Max Effluent	0.021	Steller Sea Lion	263	0.08	0	1	1	1	0	model	17420	10.556	15.996	3.86E+00	3.09E-01	0	3.1E-01	0.147	2.10E+00	**Yes**
Pesticides	4,4'-DDE	Max Effluent	0.0047	Steller Sea Lion	263	0.08	0	1	1	1	0	model	36672	13.662	24.604	2.35E+00	1.88E-01	0	1.9E-01	0.147	1.28E+00	**Yes**
Pesticides	4,4'-DDT	Max Effluent	0.000186	Steller Sea Lion	263	0.08	0	1	1	1	0	model	67360	14.388	26.669	1.80E-01	1.44E-02	0	1.4E-02	0.147	9.81E-02	No

Table C-17. Preliminary Screening - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Media	Maximum Detect Effluent (ug/L)	Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	12 Month Site Risk		
				Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		Maximum Detect Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)			No Effect TRV (mg/kg/d)	Screening HQ	Retain for Refined Assessment
										Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4						
Pesticides	Aldrin	Max Effluent	0.0097	Steller Sea Lion	263	0.08	0	1	1	1	0	model	36120	13.662	24.604	4.79E+00	3.83E-01	0	3.8E-01	0.2	1.91E+00	Yes
Pesticides	Chlordane, alpha (cis)	Max Effluent	0.000142	Steller Sea Lion	263	0.08	0	1	1	1	0	model	23604	12.064	19.907	4.04E-02	3.23E-03	0	3.2E-03	0.15	2.16E-02	No
Pesticides	Chlorpyriphos	Max Effluent	0.000972	Steller Sea Lion	263	0.08	0	1	1	1	0	model	3480.8	3.181	2.612	1.08E-02	8.61E-04	0	8.6E-04	0.1	8.61E-03	No
Pesticides	Chlorpyriphos-Methyl	Max Effluent	0.000211	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1296.4	1.491	1.178	4.08E-04	3.26E-05	0	3.3E-05	0.1	3.26E-04	No
Pesticides	Cypermethrin	Max Effluent	0.00405	Steller Sea Lion	263	0.08	0	1	1	1	0	model	3881.2	14.388	26.669	2.26E-01	1.81E-02	0	1.8E-02	0.2	9.05E-02	No
Pesticides	DEET	Max Effluent	6.36	Steller Sea Lion	263	0.08	0	1	1	1	0	model	51	1.005	1	3.26E-01	2.61E-02	0	2.6E-02	1	2.61E-02	No
Pesticides	Demeton-O,S	Max Effluent	0.038	Steller Sea Lion	263	0.08	0	1	1	1	0	model	38.352	1	1	1.46E-03	1.17E-04	0	1.2E-04	0.008	1.46E-02	No
Pesticides	Dieldrin	Max Effluent	0.014	Steller Sea Lion	263	0.08	0	1	1	1	0	model	5012	4.188	3.873	2.94E-01	2.35E-02	0	2.4E-02	0.015	1.57E+00	Yes
Pesticides	Endosulfan Sulfate	Max Effluent	0.022	Steller Sea Lion	263	0.08	0	1	1	1	0	model	482.8	1.128	1.033	1.20E-02	9.58E-04	0	9.6E-04	0.058	1.65E-02	No
Pesticides	Endrin	Max Effluent	0.000062	Steller Sea Lion	263	0.08	0	1	1	1	0	model	5012	4.188	3.873	1.30E-03	1.04E-04	0	1.0E-04	0.184	5.66E-04	No
Pesticides	Endrin Ketone	Max Effluent	0.0096	Steller Sea Lion	263	0.08	0	1	1	1	0	model	3623.2	3.181	2.612	1.11E-01	8.85E-03	0	8.9E-03	0.184	4.81E-02	No
Pesticides	HCH, alpha	Max Effluent	0.000066	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1001.6	1.315	1.096	8.69E-05	6.95E-06	0	7.0E-06	87	7.99E-08	No
Pesticides	HCH, beta	Max Effluent	0.000109	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1001.6	1.315	1.096	1.44E-04	1.15E-05	0	1.1E-05	0.4	2.87E-05	No
Pesticides	HCH, gamma	Max Effluent	0.000696	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1001.6	1.315	1.096	9.17E-04	7.33E-05	0	7.3E-05	0.014	5.24E-03	No
Pesticides	Heptachlor	Max Effluent	0.014	Steller Sea Lion	263	0.08	0	1	1	1	0	model	7552	6.266	7.079	6.62E-01	5.30E-02	0	5.3E-02	0.2	2.65E-01	No
Pesticides	Hexachlorobenzene	Max Effluent	0.000517	Steller Sea Lion	263	0.08	0	1	1	1	0	model	11212	7.962	10.209	4.62E-02	3.69E-03	0	3.7E-03	7.1	5.20E-04	No
Pesticides	Malathion	Max Effluent	0.52	Steller Sea Lion	263	0.08	0	1	1	1	0	model	67	1.01	1.002	3.52E-02	2.82E-03	0	2.8E-03	0.046	6.12E-02	No
Pesticides	Methoxychlor	Max Effluent	0.0029	Steller Sea Lion	263	0.08	0	1	1	1	0	model	4176	3.643	3.162	4.41E-02	3.53E-03	0	3.5E-03	1.002	3.52E-03	No
Pesticides	Permethrin	Max Effluent	0.0423	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1989.2	13.662	24.604	1.15E+00	9.20E-02	0	9.2E-02	5	1.84E-02	No
PFAS	5:3 FTCA	Max Effluent	0.0592	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1.766	1.334	1.32E-03	1.06E-04	0	1.1E-04	5	2.12E-05	No
PFAS	PFBA	Max Effluent	0.0149	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1.005	1	1.89E-04	1.52E-05	0	1.5E-05	35	4.33E-07	No
PFAS	PFHpA	Max Effluent	0.00847	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1.315	1.096	1.41E-04	1.13E-05	0	1.1E-05	--	--	Uncertainty
PFAS	PFHxA	Max Effluent	0.0255	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1.083	1.019	3.49E-04	2.79E-05	0	2.8E-05	20	1.40E-06	No
PFAS	PFHxS	Max Effluent	0.0396	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1.042	1.009	5.22E-04	4.18E-05	0	4.2E-05	5.72	7.30E-06	No
PFAS	PFNA	Max Effluent	0.00514	Steller Sea Lion	263	0.08	0	1	1	1	0	model	40	6.266	7.079	1.29E-03	1.03E-04	0	1.0E-04	0.166	6.21E-04	No
PFAS	PFOA	Max Effluent	0.0185	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	2.452	1.871	5.74E-04	4.59E-05	0	4.6E-05	1.75	2.62E-05	No
PFAS	PFOS	Max Effluent	0.0653	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1.766	1.334	1.46E-03	1.17E-04	0	1.2E-04	0.12	9.72E-04	No
PFAS	PFPeA	Max Effluent	0.0203	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1.028	1.007	2.64E-04	2.11E-05	0	2.1E-05	--	--	Uncertainty
PFAS	PFPeS	Max Effluent	0.00384	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1.01	1.002	4.91E-05	3.92E-06	0	3.9E-06	--	--	Uncertainty
Plasticizer	Bisphenol A	Max Effluent	1.59	Steller Sea Lion	263	0.08	0	1	1	1	0	model	288.12	1.053	1.012	4.82E-01	3.86E-02	0	3.9E-02	10	3.86E-03	No
Plasticizer	Bisphenol S	Max Effluent	0.888	Steller Sea Lion	263	0.08	0	1	1	1	0	model	22.672	1	1	2.01E-02	1.61E-03	0	1.6E-03	10	1.61E-04	No
Pyrimidine antibiotic	Trimethoprim	Max Effluent	0.711	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	8.99E-03	7.19E-04	0	7.2E-04	0.8	8.99E-04	No
Quinoline antibiotic	Ciprofloxacin	Max Effluent	0.372	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	4.71E-03	3.76E-04	0	3.8E-04	4	9.41E-05	No
Quinoline antibiotic	Ofloxacin	Max Effluent	0.427	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	5.40E-03	4.32E-04	0	4.3E-04	2	2.16E-04	No
Rubber Stabilizing compound	6PPD-Quinone	Max Effluent	0.0053	Steller Sea Lion	263	0.08	0	1	1	1	0	model	781.6	1.253	1.072	5.19E-03	4.15E-04	0	4.2E-04	2	2.08E-04	No
Sex hormone	17 beta-Estradiol	Max Effluent	0.00552	Steller Sea Lion	263	0.08	0	1	1	1	0	model	822	1.253	1.072	5.69E-03	4.55E-04	0	4.5E-04	0.01	4.55E-02	No
Sex hormone	Estrone	Max Effluent	0.0331	Steller Sea Lion	263	0.08	0	1	1	1	0	model	215.88	1.034	1.007	7.39E-03	5.91E-04	0	5.9E-04	--	--	Uncertainty
Sex hormone	Progesterone	Max Effluent	0.0566	Steller Sea Lion	263	0.08	0	1	1	1	0	model	664.4	1.202	1.054	4.52E-02	3.62E-03	0	3.6E-03	0.66	5.48E-03	No
Sex hormone	Testosterone	Max Effluent	0.0717	Steller Sea Lion	263	0.08	0	1	1	1	0	model	288.12	1.053	1.012	2.18E-02	1.74E-03	0	1.7E-03	1.72	1.01E-03	No
SSRI Antidepressant	Fluoxetine	Max Effluent	0.052	Steller Sea Lion	263	0.08	0	1	1	1	0	model	616	1.161	1.042	3.72E-02	2.98E-03	0	3.0E-03	1.136	2.62E-03	No
SSRI Antidepressant	Norfluoxetine	Max Effluent	0.0273	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1068	1.38	1.13	4.02E-02	3.22E-03	0	3.2E-03	--	--	Uncertainty
SSRI Antidepressant	Paroxetine	Max Effluent	0.0188	Steller Sea Lion	263	0.08	0	1	1	1	0	model	754.4	1.253	1.072	1.78E-02	1.42E-03	0	1.4E-03	--	--	Uncertainty
SSRI Antidepressant	Sertraline	Max Effluent	0.108	Steller Sea Lion	263	0.08	0	1	1	1	0	model	5716	4.803	4.742	2.97E+00	2.37E-01	0	2.4E-01	--	--	Uncertainty
Statin	Atorvastatin	Max Effluent	0.22	Steller Sea Lion	263	0.08	0	1	1	1	0	model	224.92	13.228	23.281	6.55E-01	5.24E-02	0	5.2E-02	20	2.62E-03	No
Steroid	Methylprednisolone	Max Effluent	0.113	Steller Sea Lion	263	0.08	0	1	1	1	0	model	29.396	1	1	3.32E-03	2.66E-04	0	2.7E-04	8	3.32E-05	No
Steroid	Prednisolone	Max Effluent	0.00931	Steller Sea Lion	263	0.08	0	1	1	1	0	model	21.772	1	1	2.03E-04	1.62E-05	0	1.6E-05	6.72	2.41E-06	No
Steroidal Estrogen	Equilenin	Max Effluent	0.0134	Steller Sea Lion	263	0.08	0	1	1	1	0	model	726.4	1.202	1.054	1.17E-02	9.36E-04	0	9.4E-04	--	--	Uncertainty
Stimulant	Amphetamine	Max Effluent	0.539	Steller Sea Lion	263	0.08	0	1	1	1	0	model	26.936	1	1	1.45E-02	1.16E-03	0	1.2E-03	0.12	9.68E-03	No
Stimulant	Caffeine	Max Effluent	105	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.33E+00	1.06E-01	0	1.1E-01	0.508	2.09E-01	No
Stimulant	Cocaine	Max Effluent	0.768	Steller Sea Lion	263	0.08	0	1	1	1	0	model	61.16	1.01	1.002	4.74E-02	3.80E-03	0	3.8E-03	0.396	9.58E-03	No
Streoid	Prednisone	Max Effluent	0.404	Steller Sea Lion	263	0.08	0	1	1	1	0	model	17.076	1	1	6.90E-03	5.52E-04	0	5.5E-04	--	--	Uncertainty
Sulfonamide antibiotic	Sulfadiazine	Max Effluent	0.00146	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.85E-05	1.48E-06	0	1.5E-06	6	2.46E-07	No
Sulfonamide antibiotic	Sulfamethizole	Max Effluent	0.00511	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	6.46E-05	5.17E-06	0	5.2E-06	14	3.69E-07	No
Sulfonamide antibiotic	Sulfamethoxazole	Max Effluent	1.08	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.37E-02	1.09E-03	0	1.1E-03	9.2	1.19E-04	No
Sulfonamide antibiotic	Sulfanilamide	Max Effluent	0.0348	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	4.40E-04	3.52E-05	0	3.5E-05	12	2.93E-06	No
SVOCs/PAHs	1,2-Diphenylhydrazine	Max Effluent	2.5	Steller Sea Lion	263	0.08	0	1	1	1	0	model	161.76	1.028	1.007	4.16E-01	3.33E-02	0	3.3E-02	--	--	Uncertainty
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	Max Effluent	0.1	Steller Sea Lion	263	0.08	0	1	1	1	0	model	2775.2	2.452	1.871	6.80E-01	5.44E-02	0	5.4E-02	65.6	8.30E-04	No
SVOCs/PAHs	1-Methyldibenzothiophene	Max Effluent	0.05	Steller Sea Lion	263	0.08	0	1	1	1	0	model	2390	2.175	1.633	2.60E-01	2.08E-02	0	2.1E-02	65.6	3.17E-04	No
SVOCs/PAHs	1-Methylfluorene	Max Effluent	0.05	Steller Sea Lion	263	0.08	0	1	1	1	0	model	3534	3.181	2.612	5.62E-01	4.50E-02	0	4.5E-02	65.6	6.85E-04	No
SVOCs/PAHs	1-Methylnaphthalene	Max Effluent	0.427	Steller Sea Lion	263	0.08	0	1	1	1	0	model	664.4	1.202	1.054	3.41E-01	2.73E-02	0	2.7E-02	0.94	2.90E-02	No
SVOCs/PAHs	1-Methylphenanthrene	Max Effluent	0.0285	Steller Sea Lion	263	0.08	0	1	1	1	0	model	19132	3.643	3.162	1.99E+00	1.59E-01	0	1.6E-01	65.6	2.42E-03	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Max Effluent	1.2	Steller Sea Lion	263	0.08	0	1	1	1	0	model	505.6	1.128	1.033	6.84E-01	5.48E-02	0	5.5E-02	3	1.83E-02	No
SVOCs/PAHs	2,6-Dimethylnaphthalene	Max Effluent	0.344	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1296.4	1.491	1.178	6.65E-01	5.32E-02	0	5.3E-02	65.6	8.11E-04	No
SVOCs/PAHs	2-Methylanthracene	Max Effluent	0.0636	Steller Sea Lion	263	0.08	0	1	1	1	0	model	3698.8	3.181	2.612	7.48E-01	5.99E-02	0	6.0E-02	65.6	9.13E-04	No
SVOCs/PAHs	2-Methylfluoranthene	Max Effluent	0.0174	Steller Sea Lion	263	0.08	0	1	1	1	0	model	7672	6.266	7.079	8.36E-01	6.69E-02	0	6.7E-02	65.6	1.02E-03	No
SVOCs/PAHs	2-Methylnaphthalene	Max Effluent	0.541	Steller Sea Lion	263	0.08	0	1	1	1	0	model	654.4	1.202	1.054	4.26E-01	3.40E-02	0	3.4E-02	65.6	5.19E-04	No
SVOCs/PAHs	2-Methylphenanthrene	Max Effluent	0.0647	Steller Sea Lion	263	0.08	0	1	1	1	0	model	13696	2.78	2.193	2.46E+00	1.97E-01	0	2.0E-01	65.6	3.00E-03	No
SVOCs/PAHs	3,6-Dimethylphenanthrene	Max Effluent	0.0189	Steller Sea Lion	263	0.08	0	1	1	1	0	model	33036	5.502	5.821	3.44E+00	2.75E-01	0	2.7E-01	65.6	4.19E-03	No
SVOCs/PAHs	3-Methylphenanthrene	Max Effluent	0.0579	Steller Sea Lion	263	0.08	0	1	1	1	0	model	13696	2.78	2.193	2.20E+00	1.76E-01	0	1.8E-01	65.6	2.69E-03	No
SVOCs/PAHs	4-Methyldibenzothiophene	Max Effluent	0.0229	Steller Sea Lion	263	0.08	0	1	1	1	0	model	2390	2.175	1.633	1.19E-01	9.52E-03	0	9.5E-03	65.6	1.45E-04	No
SVOCs/PAHs	Acenaphthene	Max Effluent	0.0821	Steller Sea Lion	263	0.08	0	1	1	1	0	model	716.8	1.202	1.054	7.07E-02	5.66E-03	0	5.7E-03	65.6	8.63E-05	No
SVOCs/PAHs	Acenaphthylene	Max Effluent	0.0125	Steller Sea Lion	263	0.08	0	1	1	1	0	model	739.2	1.202	1.054	1.11E-02	8.89E-04	0	8.9E-04	65.6	1.35E-05	No
SVOCs/PAHs	Anthracene	Max Effluent	0.0553	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1604	1.766	1.334	1.57E-01	1.25E-02	0	1.3E-02	65.6	1.91E-04	No

Table C-17. Preliminary Screening - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Media	Maximum Detect Effluent (ug/L)	Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	12 Month Site Risk		
				Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		Maximum Detect Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)			No Effect TRV (mg/kg/d)	Screening HQ	Retain for Refined Assessment
										Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4							
SVOCs/PAHs	Benz(a)anthracene	Max Effluent	0.25	Steller Sea Lion	263	0.08	0	1	1	1	0	model	11736	8.841	12.05	2.59E+01	2.08E+00	0	2.1E+00	0.62	3.35E+00	Yes
SVOCs/PAHs	Benzo(a)fluoranthene	Max Effluent	0.0151	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12096	8.841	12.05	1.61E+00	1.29E-01	0	1.3E-01	0.615	2.10E-01	No
SVOCs/PAHs	Benzo(a)pyrene	Max Effluent	0.0563	Steller Sea Lion	263	0.08	0	1	1	1	0	model	20588	11.337	17.783	1.31E+01	1.05E+00	0	1.1E+00	0.62	1.70E+00	Yes
SVOCs/PAHs	Benzo(b)fluoranthene	Max Effluent	0.049	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12096	8.841	12.05	5.24E+00	4.19E-01	0	4.2E-01	0.62	6.76E-01	No
SVOCs/PAHs	Benzo(b)fluorene	Max Effluent	0.0406	Steller Sea Lion	263	0.08	0	1	1	1	0	model	11916	8.841	12.05	4.28E+00	3.42E-01	0	3.4E-01	0.615	5.56E-01	No
SVOCs/PAHs	Benzo(e)pyrene	Max Effluent	0.0523	Steller Sea Lion	263	0.08	0	1	1	1	0	model	32976	13.228	23.281	2.28E+01	1.83E+00	0	1.8E+00	0.615	2.97E+00	Yes
SVOCs/PAHs	Benzo(g,h,i)perylene	Max Effluent	0.0833	Steller Sea Lion	263	0.08	0	1	1	1	0	model	44000	13.98	25.645	5.12E+01	4.10E+00	0	4.1E+00	14.4	2.85E-01	No
SVOCs/PAHs	Benzo(k,j)fluoranthene	Max Effluent	0.0334	Steller Sea Lion	263	0.08	0	1	1	1	0	model	19972	11.337	17.783	7.56E+00	6.05E-01	0	6.1E-01	0.615	9.84E-01	No
SVOCs/PAHs	Benzothiophene	Max Effluent	0.0144	Steller Sea Lion	263	0.08	0	1	1	1	0	model	212.64	1.034	1.007	3.17E-03	2.53E-04	0	2.5E-04	0.615	4.12E-04	No
SVOCs/PAHs	Biphenyl	Max Effluent	0.102	Steller Sea Lion	263	0.08	0	1	1	1	0	model	822	1.253	1.072	1.05E-01	8.40E-03	0	8.4E-03	0.615	1.37E-02	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Max Effluent	95	Steller Sea Lion	263	0.08	0	1	1	1	0	model	6848	11.708	16.749	7.62E+03	6.09E+02	0	6.1E+02	18.3	3.33E+01	Yes
SVOCs/PAHs	Butyl Benzyl Phthalate	Max Effluent	5.62	Steller Sea Lion	263	0.08	0	1	1	1	0	model	2454.4	2.175	1.633	3.00E+01	2.40E+00	0	2.4E+00	159	1.51E-02	No
SVOCs/PAHs	Carbazole	Max Effluent	0.201	Steller Sea Lion	263	0.08	0	1	1	1	0	model	529.2	1.128	1.033	1.20E-01	9.60E-03	0	9.6E-03	0.615	1.56E-02	No
SVOCs/PAHs	Chrysene/Triphenylene	Max Effluent	0.0614	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12660	8.841	12.05	6.87E+00	5.50E-01	0	5.5E-01	0.615	8.94E-01	No
SVOCs/PAHs	cis/trans Decalin	Max Effluent	0.484	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1091.2	1.38	1.13	7.29E-01	5.83E-02	0	5.8E-02	16.68	3.50E-03	No
SVOCs/PAHs	Dibenzo(a,h)anthracene	Max Effluent	0.00668	Steller Sea Lion	263	0.08	0	1	1	1	0	model	38384	13.662	24.604	3.50E+00	2.80E-01	0	2.8E-01	2.66	1.05E-01	No
SVOCs/PAHs	Dibenzofuran	Max Effluent	0.0698	Steller Sea Lion	263	0.08	0	1	1	1	0	model	971.6	1.315	1.096	8.92E-02	7.13E-03	0	7.1E-03	0.615	1.16E-02	No
SVOCs/PAHs	Dibenzothiophene	Max Effluent	0.0335	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1442	1.614	1.242	7.80E-02	6.24E-03	0	6.2E-03	1.04	6.00E-03	No
SVOCs/PAHs	Diethyl Phthalate	Max Effluent	3.7	Steller Sea Lion	263	0.08	0	1	1	1	0	model	73.4	1.01	1.002	2.74E-01	2.19E-02	0	2.2E-02	4600	4.77E-06	No
SVOCs/PAHs	Dimethyl Phthalate	Max Effluent	0.12	Steller Sea Lion	263	0.08	0	1	1	1	0	model	21.124	1	1	2.53E-03	2.03E-04	0	2.0E-04	68	2.98E-06	No
SVOCs/PAHs	Di-n-butyl Phthalate	Max Effluent	0.84	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1730.4	1.766	1.334	2.57E+00	2.05E-01	0	2.1E-01	1340	1.53E-04	No
SVOCs/PAHs	Di-n-octyl Phthalate	Max Effluent	18.9	Steller Sea Lion	263	0.08	0	1	1	1	0	model	3895.6	7.278	6.012	5.36E+02	4.29E+01	0	4.3E+01	36.8	1.16E+00	Yes
SVOCs/PAHs	Fluoranthene	Max Effluent	0.317	Steller Sea Lion	263	0.08	0	1	1	1	0	model	4716	4.188	3.873	6.26E+00	5.01E-01	0	5.0E-01	125	4.01E-03	No
SVOCs/PAHs	Fluorene	Max Effluent	0.126	Steller Sea Lion	263	0.08	0	1	1	1	0	model	1064.4	1.38	1.13	1.85E-01	1.48E-02	0	1.5E-02	125	1.18E-04	No
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	Max Effluent	0.0444	Steller Sea Lion	263	0.08	0	1	1	1	0	model	48720	14.223	26.363	3.08E+01	2.46E+00	0	2.5E+00	7.2	3.42E-01	No
SVOCs/PAHs	Isophorone	Max Effluent	0.38	Steller Sea Lion	263	0.08	0	1	1	1	0	model	24.588	1	1	9.34E-03	7.47E-04	0	7.5E-04	150	4.98E-06	No
SVOCs/PAHs	Naphthalene	Max Effluent	0.98	Steller Sea Lion	263	0.08	0	1	1	1	0	model	279.52	1.053	1.012	2.88E-01	2.31E-02	0	2.3E-02	71	3.25E-04	No
SVOCs/PAHs	Naphthobenzothiophene	Max Effluent	0.0337	Steller Sea Lion	263	0.08	0	1	1	1	0	model	4936	4.188	3.873	6.97E-01	5.57E-02	0	5.6E-02	0.615	9.06E-02	No
SVOCs/PAHs	N-Nitrosodimethylamine	Max Effluent	9.6	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.21E-01	9.71E-03	0	9.7E-03	0.005	1.94E+00	Yes
SVOCs/PAHs	Pentachlorophenol (PCP)	Max Effluent	6.3	Steller Sea Lion	263	0.08	0	1	1	1	0	model	4440	3.643	3.162	1.02E+02	8.15E+00	0	8.2E+00	8.42	9.68E-01	No
SVOCs/PAHs	Perylene	Max Effluent	0.0333	Steller Sea Lion	263	0.08	0	1	1	1	0	model	24708	12.691	21.677	1.04E+01	8.35E-01	0	8.4E-01	0.615	1.36E+00	Yes
SVOCs/PAHs	Phenanthrene	Max Effluent	0.98	Steller Sea Lion	263	0.08	0	1	1	1	0	model	7460	1.766	1.334	1.29E+01	1.03E+00	0	1.0E+00	65.6	1.57E-02	No
SVOCs/PAHs	Phenol	Max Effluent	54.5	Steller Sea Lion	263	0.08	0	1	1	1	0	model	17.076	1	1	9.31E-01	7.45E-02	0	7.4E-02	60	1.24E-03	No
SVOCs/PAHs	Pyrene	Max Effluent	0.47	Steller Sea Lion	263	0.08	0	1	1	1	0	model	3082.4	2.78	2.193	4.03E+00	3.22E-01	0	3.2E-01	0.615	5.24E-01	No
SVOCs/PAHs	Retene	Max Effluent	0.0108	Steller Sea Lion	263	0.08	0	1	1	1	0	model	131400	12.691	21.677	1.80E+01	1.44E+00	0	1.4E+00	65.6	2.20E-02	No
Tetracycline antibiotic	Doxycycline	Max Effluent	0.15	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.90E-03	1.52E-04	0	1.5E-04	4.0298	3.77E-05	No
Tetracycline antibiotic	Tetracycline [TC]	Max Effluent	0.0979	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.24E-03	9.91E-05	0	9.9E-05	6.4	1.55E-05	No
Tranquilizer	Meprobamate	Max Effluent	0.383	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	4.84E-03	3.88E-04	0	3.9E-04	3	1.29E-04	No
Urinary steroid	Androsterone	Max Effluent	0.0571	Steller Sea Lion	263	0.08	0	1	1	1	0	model	505.6	1.128	1.033	3.26E-02	2.61E-03	0	2.6E-03	200	1.30E-05	No
VOCs	1,1,1-Trichloroethane (TCA)	Max Effluent	0.79	Steller Sea Lion	263	0.08	0	1	1	1	0	model	81.64	1.01	1.002	6.51E-02	5.21E-03	0	5.2E-03	999	5.22E-06	No
VOCs	1,2-Dichloroethane (EDC)	Max Effluent	0.08	Steller Sea Lion	263	0.08	0	1	1	1	0	model	17.604	1	1	1.41E-03	1.13E-04	0	1.1E-04	382	2.95E-07	No
VOCs	1,4-Dichlorobenzene	Max Effluent	0.84	Steller Sea Lion	263	0.08	0	1	1	1	0	model	345.76	1.067	1.014	3.10E-01	2.48E-02	0	2.5E-02	2.5	9.92E-03	No
VOCs	2-Butanone (MEK)	Max Effluent	68	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	8.60E-01	6.88E-02	0	6.9E-02	1771	3.89E-05	No
VOCs	2-Hexanone	Max Effluent	5.7	Steller Sea Lion	263	0.08	0	1	1	1	0	model	15.12	1	1	8.62E-02	6.89E-03	0	6.9E-03	8.27	8.34E-04	No
VOCs	Acetone	Max Effluent	300	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	3.79E+00	3.04E-01	0	3.0E-01	20	1.52E-02	No
VOCs	Acrolein	Max Effluent	1.3	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	1.64E-02	1.32E-03	0	1.3E-03	0.05	2.63E-02	No
VOCs	Benzene	Max Effluent	0.78	Steller Sea Lion	263	0.08	0	1	1	1	0	model	47.24	1.005	1	3.70E-02	2.96E-03	0	3.0E-03	26.36	1.12E-04	No
VOCs	Bromodichloromethane	Max Effluent	0.08	Steller Sea Lion	263	0.08	0	1	1	1	0	model	38.784	1.005	1	3.12E-03	2.49E-04	0	2.5E-04	3.58	6.97E-05	No
VOCs	Bromomethane	Max Effluent	0.09	Steller Sea Lion	263	0.08	0	1	1	1	0	model	11.328	1	1	1.02E-03	8.16E-05	0	8.2E-05	0.284	2.87E-04	No
VOCs	Carbon Disulfide	Max Effluent	0.7	Steller Sea Lion	263	0.08	0	1	1	1	0	model	35.404	1	1	2.48E-02	1.98E-03	0	2.0E-03	11	1.80E-04	No
VOCs	Chlorobenzene	Max Effluent	0.08	Steller Sea Lion	263	0.08	0	1	1	1	0	model	138.96	1.028	1.007	1.14E-02	9.14E-04	0	9.1E-04	19	4.81E-05	No
VOCs	Chloroethane	Max Effluent	0.69	Steller Sea Lion	263	0.08	0	1	1	1	0	model	16.316	1	1	1.13E-02	9.01E-04	0	9.0E-04	--	--	Uncertainty
VOCs	Chloroform	Max Effluent	3.95	Steller Sea Lion	263	0.08	0	1	1	1	0	model	37.056	1	1	1.46E-01	1.17E-02	0	1.2E-02	2.58	4.54E-03	No
VOCs	Chloromethane	Max Effluent	1.9	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.648	1	1	2.40E-02	1.92E-03	0	1.9E-03	3.2	6.01E-04	No
VOCs	cis-1,2-Dichloroethene	Max Effluent	0.07	Steller Sea Lion	263	0.08	0	1	1	1	0	model	38.784	1.005	1	2.73E-03	2.18E-04	0	2.2E-04	90.4	2.41E-06	No
VOCs	Dichloromethane (Methylene Chlorid	Max Effluent	6.85	Steller Sea Lion	263	0.08	0	1	1	1	0	model	12.412	1	1	8.50E-02	6.80E-03	0	6.8E-03	5.85	1.16E-03	No
VOCs	Ethylbenzene	Max Effluent	1.5	Steller Sea Lion	263	0.08	0	1	1	1	0	model	222.56	1.042	1.009	3.48E-01	2.78E-02	0	2.8E-02	97.1	2.87E-04	No
VOCs	m,p-Xylenes	Max Effluent	6.2	Steller Sea Lion	263	0.08	0	1	1	1	0	model	226	1.042	1.009	1.46E+00	1.17E-01	0	1.2E-01	2.1	5.56E-02	No
VOCs	o-Xylene	Max Effluent	2.6	Steller Sea Lion	263	0.08	0	1	1	1	0	model	225.96	1.042	1.009	6.12E-01	4.90E-02	0	4.9E-02	2.1	2.33E-02	No
VOCs	Styrene	Max Effluent	5.5	Steller Sea Lion	263	0.08	0	1	1	1	0	model	164.24	1.028	1.007	9.29E-01	7.43E-02	0	7.4E-02	200	3.71E-04	No
VOCs	Tetrachloroethene (PCE)	Max Effluent	0.6	Steller Sea Lion	263	0.08	0	1	1	1	0	model	325.36	1.067	1.014	2.08E-01	1.67E-02	0	1.7E-02	63	2.65E-04	No
VOCs	Toluene	Max Effluent	16	Steller Sea Lion	263	0.08	0	1	1	1	0	model	117.56	1.01	1.002	1.90E+00	1.52E-01	0	1.5E-01	26	5.85E-03	No
VOCs	Trichloroethene (TCE)	Max Effluent	0.07	Steller Sea Lion	263	0.08	0	1	1	1	0	model	73.4	1.01	1.002	5.19E-03	4.15E-04	0	4.2E-04	2.8	1.48E-04	No
VOCs	Vinyl Chloride	Max Effluent	0.02	Steller Sea Lion	263	0.08	0	1	1	1	0	model	21.884	1	1	4.38E-04	3.50E-05	0	3.5E-05	0.17	2.06E-04	No
Beluga - Measured Fish Tissue Model																						
Metals	Antimony	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.014	--	--	--	1.40E-02	4.20E-04	--	4.2E-04	0.059	7.12E-03	No
Metals	Arsenic	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	9.25	--	--	--	9.25E+00	2.78E-01	--	2.8E-01	1.04	2.67E-01	No
Metals	Beryllium	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0062	--	--	--	6.20E-03	1.86E-04	--	1.9E-04	0.532	3.50E-04	No
Metals	Cadmium	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.747	--	--	--	7.47E-01	2.24E-02	--	2.2E-02	0.77	2.91E-02	No
Metals	Chromium	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.884	--	--	--	8.84E-01	2.65E-02	--	2.7E-02	2.4	1.11E-02	No
Metals	Copper	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	19.7	--	--	--	1.97E+01	5.91E-01	--	5.9E-01	5.6	1.06E-01	No
Metals	Lead	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0812	--	--	--	8.12E-02	2.44E-03	--	2.4E-03	4.7	5.18E-04	No
Metals	Mercury	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0465	--	--	--	4.65E-02	1.40E-03	--	1.4E-03	1.41	9.89E-04	No

Table C-17. Preliminary Screening - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Media	Maximum Detect Effluent (ug/L)	Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	12 Month Site Risk		
				Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		Maximum Detect Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)			No Effect TRV (mg/kg/d)	Screening HQ	Retain for Refined Assessment
										Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4							
Metals	Methyl Mercury	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0437	--	--	--	4.37E-02	1.31E-03	--	1.3E-03	0.032	4.10E-02	No
Metals	Molybdenum	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.052	--	--	--	5.20E-02	1.56E-03	--	1.6E-03	0.52	3.00E-03	No
Metals	Nickel	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.575	--	--	--	5.75E-01	1.73E-02	--	1.7E-02	1.7	1.01E-02	No
Metals	Selenium	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.99	--	--	--	9.90E-01	2.97E-02	--	3.0E-02	0.143	2.08E-01	No
Metals	Silver	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.246	--	--	--	2.46E-01	7.38E-03	--	7.4E-03	6.02	1.23E-03	No
Metals	Thallium	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0037	--	--	--	3.70E-03	1.11E-04	--	1.1E-04	0.096	1.16E-03	No
Metals	Zinc	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	50.9	--	--	--	5.09E+01	1.53E+00	--	1.5E+00	75.4	2.03E-02	No
PCBs	Aroclor 1254	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0049	--	--	--	4.90E-03	1.47E-04	--	1.5E-04	0.137	1.07E-03	No
PCBs	Aroclor 1260	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0058	--	--	--	5.80E-03	1.74E-04	--	1.7E-04	0.137	1.27E-03	No
Pesticides	Chlordane, alpha (cis)	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.015	--	--	--	1.50E-02	4.50E-04	--	4.5E-04	0.15	3.00E-03	No
Pesticides	Mirex	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.002	--	--	--	2.00E-03	6.00E-05	--	6.0E-05	0.07	8.57E-04	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.029	--	--	--	2.90E-02	8.70E-04	--	8.7E-04	3	2.90E-04	No
SVOCs/PAHs	2-Nitrophenol	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.098	--	--	--	9.80E-02	2.94E-03	--	2.9E-03	400	7.35E-06	No
SVOCs/PAHs	4-Nitrophenol	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.2	--	--	--	2.00E-01	6.00E-03	--	6.0E-03	400	1.50E-05	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.91	--	--	--	9.10E-01	2.73E-02	--	2.7E-02	18.3	1.49E-03	No
SVOCs/PAHs	Di-n-octyl Phthalate	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.24	--	--	--	2.40E-01	7.20E-03	--	7.2E-03	36.8	1.96E-04	No
SVOCs/PAHs	Nitrobenzene	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.034	--	--	--	3.40E-02	1.02E-03	--	1.0E-03	5.9	1.73E-04	No
SVOCs/PAHs	N-Nitrosodimethylamine	Cook Inlet, Fish Tissue	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.32	--	--	--	3.20E-01	9.60E-03	--	9.6E-03	0.005	1.92E+00	Yes
Steller Sea Lion -Measured Fish Model																						
Metals	Antimony	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.014	--	--	--	1.40E-02	1.12E-03	--	1.1E-03	0.059	1.90E-02	No
Metals	Arsenic	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	9.25	--	--	--	9.25E+00	7.40E-01	--	7.4E-01	1.04	7.12E-01	No
Metals	Beryllium	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0062	--	--	--	6.20E-03	4.96E-04	--	5.0E-04	0.532	9.32E-04	No
Metals	Cadmium	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.747	--	--	--	7.47E-01	5.98E-02	--	6.0E-02	0.77	7.76E-02	No
Metals	Chromium	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.884	--	--	--	8.84E-01	7.07E-02	--	7.1E-02	2.4	2.95E-02	No
Metals	Copper	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	19.7	--	--	--	1.97E+01	1.58E+00	--	1.6E+00	5.6	2.81E-01	No
Metals	Lead	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0812	--	--	--	8.12E-02	6.50E-03	--	6.5E-03	4.7	1.38E-03	No
Metals	Mercury	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0465	--	--	--	4.65E-02	3.72E-03	--	3.7E-03	1.41	2.64E-03	No
Metals	Methyl Mercury	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0437	--	--	--	4.37E-02	3.50E-03	--	3.5E-03	0.032	1.09E-01	No
Metals	Molybdenum	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.052	--	--	--	5.20E-02	4.16E-03	--	4.2E-03	0.52	8.00E-03	No
Metals	Nickel	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.575	--	--	--	5.75E-01	4.60E-02	--	4.6E-02	1.7	2.71E-02	No
Metals	Selenium	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.99	--	--	--	9.90E-01	7.92E-02	--	7.9E-02	0.143	5.54E-01	No
Metals	Silver	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.246	--	--	--	2.46E-01	1.97E-02	--	2.0E-02	6.02	3.27E-03	No
Metals	Thallium	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0037	--	--	--	3.70E-03	2.96E-04	--	3.0E-04	0.096	3.08E-03	No
Metals	Zinc	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	50.9	--	--	--	5.09E+01	4.07E+00	--	4.1E+00	75.4	5.40E-02	No
PCBs	Aroclor 1254	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0049	--	--	--	4.90E-03	3.92E-04	--	3.9E-04	0.137	2.86E-03	No
PCBs	Aroclor 1260	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0058	--	--	--	5.80E-03	4.64E-04	--	4.6E-04	0.137	3.39E-03	No
Pesticides	Chlordane, alpha (cis)	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.015	--	--	--	1.50E-02	1.20E-03	--	1.2E-03	0.15	8.00E-03	No
Pesticides	Mirex	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.002	--	--	--	2.00E-03	1.60E-04	--	1.6E-04	0.07	2.29E-03	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.029	--	--	--	2.90E-02	2.32E-03	--	2.3E-03	3	7.73E-04	No
SVOCs/PAHs	2-Nitrophenol	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.098	--	--	--	9.80E-02	7.84E-03	--	7.8E-03	400	1.96E-05	No
SVOCs/PAHs	4-Nitrophenol	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.2	--	--	--	2.00E-01	1.60E-02	--	1.6E-02	400	4.00E-05	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.91	--	--	--	9.10E-01	7.28E-02	--	7.3E-02	18.3	3.98E-03	No
SVOCs/PAHs	Di-n-octyl Phthalate	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.24	--	--	--	2.40E-01	1.92E-02	--	1.9E-02	36.8	5.22E-04	No
SVOCs/PAHs	Nitrobenzene	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.034	--	--	--	3.40E-02	2.72E-03	--	2.7E-03	5.9	4.61E-04	No
SVOCs/PAHs	N-Nitrosodimethylamine	Cook Inlet, Fish Tissue	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.32	--	--	--	3.20E-01	2.56E-02	--	2.6E-02	0.005	5.12E+00	Yes

Notes:

AUF = Area use factor

BCF = bioconcentration factor

FCM = food chain multiplier

HQ = hazard quotient

TRV = threshold residual value

kg = kilogram

kg/kgbw/d = kilogram per kilogram of bodyweight per day

L/kgbw/d = liters per kilogram of bodyweight per day

mg/kg = milograms per kilogram

L/kg = liters per kilogram

Table C-18. Preliminry Screening Summary - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Retain for Refined Assessment	Exposure Media	Receptor
Beluga Whale - Modeled Diet from Effluent			
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	Max Effluent	Beluga Whale
PBDEs	2,2',4,4'-TeBDE (BDE-47)	Max Effluent	Beluga Whale
SVOCs/PAHs	Benz(a)anthracene	Max Effluent	Beluga Whale
SVOCs/PAHs	Benzo(e)pyrene	Max Effluent	Beluga Whale
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Max Effluent	Beluga Whale
Steller Sea Lion - Modeled Diet from Effluent			
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	Max Effluent	Steller Sea Lion
PBDEs	2,2',4,4',6-PeBDE	Max Effluent	Steller Sea Lion
PBDEs	2,2',4,4'-TeBDE (BDE-47)	Max Effluent	Steller Sea Lion
PBDEs	2,2',4,5'-TeBDE	Max Effluent	Steller Sea Lion
PBDEs	2,3',4,4'-TeBDE	Max Effluent	Steller Sea Lion
Pesticides	4,4'-DDD	Max Effluent	Steller Sea Lion
Pesticides	4,4'-DDE	Max Effluent	Steller Sea Lion
Pesticides	Aldrin	Max Effluent	Steller Sea Lion
Pesticides	Dieldrin	Max Effluent	Steller Sea Lion
SVOCs/PAHs	Benz(a)anthracene	Max Effluent	Steller Sea Lion
SVOCs/PAHs	Benzo(a)pyrene	Max Effluent	Steller Sea Lion
SVOCs/PAHs	Benzo(e)pyrene	Max Effluent	Steller Sea Lion
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Max Effluent	Steller Sea Lion
SVOCs/PAHs	Di-n-octyl Phthalate	Max Effluent	Steller Sea Lion
SVOCs/PAHs	N-Nitrosodimethylamine	Max Effluent	Steller Sea Lion
SVOCs/PAHs	Perylene	Max Effluent	Steller Sea Lion
Measured Fish Diet			
SVOCs/PAHs	N-Nitrosodimethylamine	Cook Inlet, Fish Tissue	Beluga Whale
SVOCs/PAHs	N-Nitrosodimethylamine	Cook Inlet, Fish Tissue	Steller Sea Lion

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4										
Beluga Whale - Modeled Diet from Effluent																											
Metals	Antimony	Edge of ZID	9.04E-01	1.09E+02	8.29E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	4	1	1	3.32E-05	9.95E-07	0	1.0E-06	0.059	2.18E-10	1.63E-10	1.09E-10	5.44E-11	No
Metals	Arsenic	Edge of ZID	3.42E+00	1.09E+02	3.14E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	176	1	1	5.52E-03	1.66E-04	0	1.7E-04	1.04	2.05E-09	1.54E-09	1.03E-09	5.14E-10	No
Metals	Beryllium	Edge of ZID	1.80E-02	1.09E+02	1.65E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	76	1	1	1.26E-05	3.77E-07	0	3.8E-07	0.532	9.13E-12	6.85E-12	4.56E-12	2.28E-12	No
Metals	Cadmium	Edge of ZID	3.09E-01	1.09E+02	2.83E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	152	1	1	4.31E-04	1.29E-05	0	1.3E-05	0.77	2.17E-10	1.62E-10	1.08E-10	5.41E-11	No
Metals	Chromium	Edge of ZID	3.46E+00	1.09E+02	3.17E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	64	1	1	2.03E-03	6.09E-05	0	6.1E-05	2.4	3.28E-10	2.46E-10	1.64E-10	8.19E-11	No
Metals	Copper	Edge of ZID	1.15E+02	1.09E+02	1.06E+00	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	144	1	1	1.52E-01	4.56E-03	0	4.6E-03	5.6	1.05E-08	7.87E-09	5.25E-09	2.62E-09	No
Metals	Dissolved Antimony	Edge of ZID	8.06E-01	1.09E+02	7.39E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	4	1	1	2.96E-05	8.87E-07	0	8.9E-07	0.059	1.94E-10	1.46E-10	9.70E-11	4.85E-11	No
Metals	Dissolved Arsenic	Edge of ZID	2.78E+00	1.09E+02	2.55E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	176	1	1	4.49E-03	1.35E-04	0	1.3E-04	1.04	1.67E-09	1.25E-09	8.35E-10	4.18E-10	No
Metals	Dissolved Beryllium	Edge of ZID	4.00E-03	1.09E+02	3.67E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	76	1	1	2.79E-06	8.37E-08	0	8.4E-08	0.532	2.03E-12	1.52E-12	1.01E-12	5.07E-13	No
Metals	Dissolved Cadmium	Edge of ZID	2.10E-01	1.09E+02	1.93E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	152	1	1	2.93E-04	8.79E-06	0	8.8E-06	0.77	1.47E-10	1.10E-10	7.36E-11	3.68E-11	No
Metals	Dissolved Chromium	Edge of ZID	3.63E+00	1.09E+02	3.33E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	64	1	1	2.13E-03	6.39E-05	0	6.4E-05	2.4	3.44E-10	2.58E-10	1.72E-10	8.59E-11	No
Metals	Dissolved Copper	Edge of ZID	4.18E+01	1.09E+02	3.83E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	144	1	1	5.52E-02	1.66E-03	0	1.7E-03	5.6	3.82E-09	2.86E-09	1.91E-09	9.54E-10	No
Metals	Dissolved Lead	Edge of ZID	1.54E+00	1.09E+02	1.41E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.79E-04	5.36E-06	0	5.4E-06	4.7	1.47E-11	1.10E-11	7.36E-12	3.68E-12	No
Metals	Dissolved Mercury	Edge of ZID	8.94E-02	1.09E+02	8.20E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	25036	2.52	12.6	5.17E-02	1.55E-03	0	1.6E-03	1.41	1.42E-08	1.07E-08	7.10E-09	3.55E-09	No
Metals	Dissolved Molybdenum	Edge of ZID	4.76E+01	1.09E+02	4.37E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	5.52E-03	1.66E-04	0	1.7E-04	0.52	4.11E-09	3.08E-09	2.06E-09	1.03E-09	No
Metals	Dissolved Nickel	Edge of ZID	9.49E+00	1.09E+02	8.71E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	188	1	1	1.64E-02	4.91E-04	0	4.9E-04	1.7	3.73E-09	2.79E-09	1.86E-09	9.32E-10	No
Metals	Dissolved Selenium	Edge of ZID	1.00E+00	1.09E+02	9.17E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.16E-04	3.48E-06	0	3.5E-06	0.143	3.14E-10	2.36E-10	1.57E-10	7.85E-11	No
Metals	Dissolved Silver	Edge of ZID	4.22E-01	1.09E+02	3.87E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	4.90E-05	1.47E-06	0	1.5E-06	6.02	3.15E-12	2.36E-12	1.57E-12	7.87E-13	No
Metals	Dissolved Thallium	Edge of ZID	3.20E-02	1.09E+02	2.94E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	3.71E-06	1.11E-07	0	1.1E-07	0.096	1.50E-11	1.12E-11	7.48E-12	3.74E-12	No
Metals	Dissolved Zinc	Edge of ZID	1.24E+02	1.09E+02	1.14E+00	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	188	1	1	2.14E-01	6.42E-03	0	6.4E-03	75.4	1.10E-09	8.23E-10	5.49E-10	2.74E-10	No
Metals	Lead	Edge of ZID	4.80E+00	1.09E+02	4.40E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	5.57E-04	1.67E-05	0	1.7E-05	4.7	4.59E-11	3.44E-11	2.29E-11	1.15E-11	No
Metals	Mercury	Edge of ZID	1.14E-01	1.09E+02	1.05E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	25036	2.52	12.6	6.60E-02	1.98E-03	0	2.0E-03	1.41	1.81E-08	1.36E-08	9.06E-09	4.53E-09	No
Metals	Molybdenum	Edge of ZID	4.87E+01	1.09E+02	4.47E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	5.65E-03	1.70E-04	0	1.7E-04	0.52	4.21E-09	3.15E-09	2.10E-09	1.05E-09	No
Metals	Nickel	Edge of ZID	6.70E+00	1.09E+02	6.15E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	188	1	1	1.16E-02	3.47E-04	0	3.5E-04	1.7	2.63E-09	1.97E-09	1.32E-09	6.58E-10	No
Metals	Selenium	Edge of ZID	1.20E+00	1.09E+02	1.10E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	19.52	1	1	2.15E-04	6.45E-06	0	6.4E-06	0.143	5.82E-10	4.36E-10	2.91E-10	1.45E-10	No
Metals	Silver	Edge of ZID	4.90E-01	1.09E+02	4.50E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	2	1	1	8.99E-06	2.70E-07	0	2.7E-07	6.02	5.78E-13	4.33E-13	2.89E-13	1.44E-13	No
Metals	Thallium	Edge of ZID	5.20E-02	1.09E+02	4.77E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	464	1	1	2.21E-04	6.64E-06	0	6.6E-06	0.096	8.92E-10	6.69E-10	4.46E-10	2.23E-10	No
Metals	Zinc	Edge of ZID	1.65E+02	1.09E+02	1.51E+00	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	188	1	1	2.85E-01	8.54E-03	0	8.5E-03	75.4	1.46E-09	1.10E-09	7.30E-10	3.65E-10	No
Cyanide	Cyanide, Total	Edge of ZID	9.00E+00	1.09E+02	8.26E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.04E-03	3.13E-05	0	3.1E-05	0.38	1.06E-09	7.98E-10	5.32E-10	2.66E-10	No
ACE inhibitor	Enalapril	Edge of ZID	1.21E-02	1.09E+02	1.11E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.40E-06	4.21E-08	0	4.2E-08	8	6.79E-14	5.09E-14	3.40E-14	1.70E-14	No
Ammonia	Total Ammonia	Edge of ZID	3.30E+04	1.09E+02	3.03E+02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	3.83E+00	1.15E-01	0	1.1E-01	--	--	--	--	--	Uncertainty
Anabolic agent	Androstenedione	Edge of ZID	1.62E-01	1.09E+02	1.49E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	121.2	1.028	1.007	1.85E-04	5.56E-06	0	5.6E-06	12	5.97E-12	4.48E-12	2.99E-12	1.49E-12	No
Analgesic	Ibuprofen	Edge of ZID	2.09E+01	1.09E+02	1.92E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1.253	1.072	3.04E-03	9.12E-05	0	9.1E-05	1.98	5.94E-10	4.45E-10	2.97E-10	1.48E-10	No
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	Edge of ZID	3.87E+01	1.09E+02	3.55E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1.01	1.002	4.54E-03	1.36E-04	0	1.4E-04	5.02	3.50E-10	2.62E-10	1.75E-10	8.74E-11	No
Anti-acid reflux	Ranitidine	Edge of ZID	8.44E-02	1.09E+02	7.74E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	9.79E-06	2.94E-07	0	2.9E-07	--	--	--	--	--	Uncertainty
Antiasthmatic	Albuterol	Edge of ZID	2.01E-02	1.09E+02	1.84E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	2.33E-06	7.00E-08	0	7.0E-08	8	1.13E-13	8.46E-14	5.64E-14	2.82E-14	No
Antiasthmatic	Theophylline	Edge of ZID	5.11E+01	1.09E+02	4.69E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	5.93E-03	1.78E-04	0	1.8E-04	0.9	2.55E-09	1.91E-09	1.27E-09	6.37E-10	No
Antibacterial	Penicillin V	Edge of ZID	1.34E-02	1.09E+02	1.23E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1.005	1	1.56E-06	4.69E-08	0	4.7E-08	14	4.32E-14	3.24E-14	2.16E-14	1.08E-14	No
Antibiotic	4-Epitetracycline [ETC]	Edge of ZID	6.62E-02	1.09E+02	6.07E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	7.68E-06	2.30E-07	0	2.3E-07	6.4	4.64E-13	3.48E-13	2.32E-13	1.16E-13	No
Antibiotic	Enrofloxacin	Edge of ZID	7.08E-04	1.09E+02	6.50E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	8.22E-08	2.46E-09	0	2.5E-09	2	1.59E-14	1.19E-14	7.95E-15	3.97E-15	No
Anticonvulsant	Benztropine	Edge of ZID	1.05E-03	1.09E+02	9.63E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1245.2	1.491	1.178	1.79E-05	5.37E-07	0	5.4E-07	0.1	6.92E-11	5.19E-11	3.46E-11	1.73E-11	No
Anticonvulsant	Carbamazepine	Edge of ZID	5.06E-01	1.09E+02	4.64E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	76.84	1.01	1.002	3.60E-04	1.08E-05	0	1.1E-05	2.116	6.59E-11	4.94E-11	3.29E-11	1.65E-11	No
Antidepressant	10-hydroxy-amitriptyline	Edge of ZID	1.92E-02	1.09E+02	1.76E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	330.56	1.067	1.014	6.21E-05	1.86E-06	0	1.9E-06	--	--	--	--	--	Uncertainty
Antidepressant	Amitriptyline	Edge of ZID	7.46E-02	1.09E+02	6.84E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	3275.6	2.78	2.193	6.23E-03	1.87E-04	0	1.9E-04	0.28	8.61E-09	6.46E-09	4.31E-09	2.15E-09	No
Antidiabetic drug	Glipizide	Edge of ZID	1.07E-02	1.09E+02	9.82E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	33.828	1	1	3.32E-06	9.96E-08	0	1.0E-07	--	--	--	--	--	Uncertainty
Antidiabetic drug	Glyburide	Edge of ZID	1.85E-02	1.09E+02	1.70E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	2689.2	2.452	1.871	1.12E-03	3.36E-05	0	3.4E-05	13	3.33E-11	2.50E-11	1.67E-11	8.33E-12	No
Antidiabetic drug	Metformin	Edge of ZID	8.93E+01	1.09E+02	8.19E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.04E-02	3.11E-04	0	3.1E-04	0.92	4.36E-09	3.27E-09	2.18E-09	1.09E-09	No
Antifungal agent	Miconazole	Edge of ZID	5.62E-02	1.09E+02	5.16E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	24768	12.691	21.677	1.62E-01	4.86E-03	0	4.9E-03	2.076	3.02E-08	2.27E-08	1.51E-08	7.55E-09	No
Antihistamine	Diphenhydramine	Edge of ZID	1.68E+00	1.09E+02	1.54E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	267.04	1.053	1.012	4.33E-03	1.30E-04	0	1.3E-04	2	8.39E-10	6.29E-10	4.19E-10	2.10E-10	No
Antihistamine	Promethazine	Edge of ZID	3.35E-02	1.09E+02	3.07E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	2771.2	2.452	1.871	2.09E-03	6.27E-05	0	6.3E-05	0.22	3.67E-09	2.76E-09	1.84E-09	9.18E-10	No
Antihypertensive	Diltiazem	Edge of ZID	4.06E-01	1.09E+02	3.72E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	112.32	1.01	1.002	4.23E-04	1.27E-05	0	1.3E-05	2.96	5.52E-11	4.14E-11	2.76E-11	1.38E-11	No
Antihypertensive	Valsartan	Edge of ZID	1.58E+01	1.09E+02	1.45E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	400	1.128	1.033	6.54E-02	1.96E-03	0	2.0E-03	--	--	--	--	--	Uncertainty
Antihypertensive	Verapamil	Edge of ZID	5.12E-02	1.09E+02	4.70E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	588.4	1.161	1.042	3.21E-04	9.63E-06	0	9.6E-06	0.456	2.72E-10	2.04E-10	1.36E-10	6.81E-11	No
Antilipemic	Gemfibrozil	Edge of ZID	1.33E+00	1.09E+02	1.22E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	2.452	1.871	3.78E-04	1.14E-05	0	1.1E-05	12.648	1.16E-11	8.68E-12	5.79E-12	2.89E-12	No
Antimicrobial, disinfectant	Triclocarban	Edge of ZID	4.89E-03	1.09E+02	4.49E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	3186	2.78	2.193	3.97E-04	1.19E-05	0	1.2E-05	138.4	1.11E-12	8.33E-13	5.56E-13	2.78E-13	No
Antimicrobial, disinfectant	Triclosan	Edge of ZID	4.31E+00	1.09E+02	3.95E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	2568.8	2.452	1.871	2.49E-01	7.47E-03	0	7.5E-03	6	1.61E-08	1.20E-08	8.03E-09	4.02E-09	No
Antipyretic, analgesic	Acetaminophen	Edge of ZID	1.22E+02	1.09E+02	1.12E+00	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.42E-02	4.25E-04	0	4.2E-04	66.66	8.22E-11	6.16E-11	4.11E-11	2.05E-11	No
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	Edge of ZID	5.78E+01	1.09E+02	5.30E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	6.71E-03	2.01E-04	0	2.0E-04	--	--	--	--	--	Uncertainty
Betablocker	Atenolol	Edge of ZID	1.88E+00	1.09E+02	1.72E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	2.18E-04	6.54E-06	0	6.5E-06	8	1.06E-11	7.91E-12	5.28E-12	2.64E-12	No
Betablocker	Metoprolol	Edge of ZID	4.89E-01	1.09E+02	4.49E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	17.944	1	1	8.05E-05	2.42E-06	0	2.4E-06	4.632	6.73E-12	5.04E-12	3.36E-12	1.68E-12	No
Betablocker	Propranolol	Edge of ZID	7.48E-02	1.09E+02	6.86E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	203.96	1.083	1.019	1.52E-04	4.55E-06	0	4.5E-06	1.28	4.58E-11	3.44E-11	2.29E-11	1.15E-11	No
BloodThinner	Warfarin	Edge of ZID	4.03E-03	1.09E+02	3.70E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	112.32	1.01	1.002	4.19E-06	1.26E-07	0	1.3E-07	0.0064	2.54E-10	1.90E-10	1.27E-10	6.34E-11	No
ChannelBlocker	Amlodipine	Edge of ZID	2.48E-02	1.09E+02	2.28E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	177.2	1.028	1.007	4.14E-05	1.24E-06	0	1.2E-06	2	8.02E-12	6.01E-12	4.01E-12	2.00E-12	No
ChannelBlocker	Dehydronifedipine	Edge of ZID	1.40E-03	1.09E+02	1.28E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	222.96	1.042	1.009	2.98E-06	8.95E-08	0	9.0E-08	--	--	--	--	--	Uncertainty
ChannelBlocker	Desmethyldiltiazem	Edge of ZID	8.36E-02	1.09E+02	7.67E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	112.32	1.01	1.002	8.70E-05	2.61E-06	0	2.6E-06	--	--	--	--	--	Uncertainty
ChannelBlocker	Norverapamil	Edge of ZID	1.89E-02	1.09E+02	1.73E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1970.4	1.95	1.459	6.66E-04	2.00E-05	0	2.0E-05	0.032	8.06E-09	6.04E-09	4.03E-09	2.01E-09	No
Cocaine metabolite	Benzoylecgonine	Edge of ZID	1.96E+00	1.09E+02	1.80E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	2.27E-04	6.82E-06	0	6.8E-06	0.3804	2.31E-10	1.74E-10	1.16E-10	5.78E-11	No
Contraceptive	Norgestrel	Edge of ZID	8.18E-02	1.09E+02	7.50E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	367.32	1.083	1.019	2.99E-04	8.96E-06	0	9.0E-06	20.04	5.77E-12	4.32E-12	2.88E-12	1.44E-12	No
Corticosteroid	Hydrocortisone	Edge of ZID	7.82E-01	1.09E+02	7.17E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	21.444	1	1	1.54E-04	4.62E-06	0	4.6E-06	0.6	9.92E-11	7.44E-11	4.96E-11	2.48E-11	No
Depressant	Alprazolam	Edge of ZID	3.23E-03	1.09E+02	2.96E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	46.56	1.005	1	1.39E-06	4.16E-08	0	4.2E-08	2.16	2.48E-13	1.86E-13	1.24E-13	6.21E-14	No
Depressant	Diazepam	Edge of ZID	8.27E-04	1.09E+02	7.59E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	134.8	1.028	1.007	1.05E-06	3.15E-08	0	3.2E-08	1.112	3.66E-13	2.74E-13	1.83E-13	9.15E-14	No
Diuretic	Furosemide	Edge of ZID	2.08E-01	1.09E+02	1.91E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1.005	1	2.43E-05	7.28E-07	0	7.3E-07	10.4	9.03E-13	6.77E-13	4.51E-13	2.26E-13	No
Diuretic	Hydrochlorothiazide	Edge of ZID	1.07E+00	1.09E+02	9.82E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.24E-04	3.72E-06	0	3.7E-06	12.32	3.90E-12	2.93E-12	1.95E-12	9.75E-13	No
Diuretic	Triamterene	Edge of ZID	9.41E-02	1.09E+02	8.63E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.09E-05	3.28E-07	0	3.3E-07	1.6	2.64E-12	1.98E-12	1.32E-12	6.60E-13	No
Fungicide and parasiticide	Thiabendazole	Edge of ZID	3.06E-02	1.09E+02	2.81E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	79.2	1.01	1.002	2.25E-05	6.74E-07	0	6.7E-07	5.2	1.67E-12	1.25E-12	8.36E-13	4.18E-13	No
Glycoside	Digoxin	Edge of ZID	7.01E-02	1.09E+02	6.43E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.6	1	1	8.10E-06	2.43E-07	0	2.4E-07	0.07112	4.41E-11	3.31E-11	2.20E-11	1.10E-11	No
Lincosamide antibiotic	Lincomycin	Edge of ZID	4.35E-02	1.09E+02	3.99E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	5.05E-06	1.51E-07	0	1.5E-07	3.132	6.24E-13	4.68E-13	3.12E-13	1.56E-13	No
Macrolide antibiotic	Azithromycin	Edge of ZID	3.41E-01	1.09E+02	3.13E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	834.4	1.253	1.072	3.27E-03	9.81E-05	0	9.8E-05	12	1.05E-10	7.91E-11	5.27E-11	2.64E-11	No
Macrolide antibiotic	Clarithromycin	Edge of ZID	1.65E-01	1.09E+02	1.51E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	225.96	1.042	1.009	3.56E-04	1.07E-05	0	1.1E-05	5.08	2.72E-11	2.04E-11	1.36E-11	6.79E-12	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
Macrolide antibiotic	Erythromycin-H2O	Edge of ZID	1.68E-01	1.09E+02	1.54E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	194.12	1.034	1.007	3.09E-04	9.28E-06	0	9.3E-06	10.32	1.16E-11	8.70E-12	5.80E-12	2.90E-12	No
Macrolide antibiotic	Roxithromycin	Edge of ZID	9.41E-04	1.09E+02	8.63E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	121.36	1.028	1.007	1.08E-06	3.23E-08	0	3.2E-08	0.8	5.21E-13	3.91E-13	2.61E-13	1.30E-13	No
Macrolide antibiotic	Tylosin	Edge of ZID	1.43E-03	1.09E+02	1.31E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	22.108	1	1	2.90E-07	8.70E-09	0	8.7E-09	3.2	3.51E-14	2.63E-14	1.75E-14	8.77E-15	No
Nicotinemetabolite	Cotinine	Edge of ZID	2.80E+00	1.09E+02	2.57E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	3.25E-04	9.75E-06	0	9.7E-06	6.416	1.96E-11	1.47E-11	9.80E-12	4.90E-12	No
Non-steroidalanti-inflammatory dr	Naproxen	Edge of ZID	1.24E+01	1.09E+02	1.14E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1.042	1.009	1.50E-03	4.50E-05	0	4.5E-05	4.936	1.18E-10	8.82E-11	5.88E-11	2.94E-11	No
Oil & Grease	Oil and Grease, Total (HEM)	Edge of ZID	4.27E+04	1.09E+02	3.92E+02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	0	0	0	0.00E+00	0.00E+00	0	0.0E+00	--	--	--	--	--	--	Uncertainty
Opiate	Codeine	Edge of ZID	1.52E-01	1.09E+02	1.39E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	11.328	1	1	1.58E-05	4.74E-07	0	4.7E-07	1.708	3.58E-12	2.68E-12	1.79E-12	8.95E-13	No
Opiate	Hydrocodone	Edge of ZID	6.87E-02	1.09E+02	6.30E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	49.8	1.005	1	3.15E-05	9.46E-07	0	9.5E-07	1.5	8.14E-12	6.10E-12	4.07E-12	2.03E-12	No
Opiate	Oxycodone	Edge of ZID	1.60E-01	1.09E+02	1.47E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.86E-05	5.57E-07	0	5.6E-07	1.28	5.61E-12	4.21E-12	2.81E-12	1.40E-12	No
Opiod	Propoxyphene	Edge of ZID	1.02E-02	1.09E+02	9.36E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1064.4	1.38	1.13	1.37E-04	4.12E-06	0	4.1E-06	0.54	9.85E-11	7.39E-11	4.93E-11	2.46E-11	No
PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-2	Edge of ZID	2.58E-02	1.09E+02	2.37E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	166.84	1.493	0.226	5.90E-05	1.77E-06	0	1.8E-06	2.22	1.03E-11	7.71E-12	5.14E-12	2.57E-12	No
PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	Edge of ZID	5.24E-03	1.09E+02	4.81E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	60560	14.355	26.669	4.18E-02	1.25E-03	0	1.3E-03	0.5	3.23E-08	2.43E-08	1.62E-08	8.09E-09	No
PBDEs	2,2',3,4,4',5,5',6-OcBDE	Edge of ZID	1.41E-03	1.09E+02	1.29E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	7728	2.732	0.778	2.73E-04	8.19E-06	0	8.2E-06	0.07	1.51E-09	1.13E-09	7.55E-10	3.77E-10	No
PBDEs	2,2',3,4,4',5',6-HpBDE	Edge of ZID	6.87E-04	1.09E+02	6.30E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	3393.2	1.493	0.226	3.19E-05	9.58E-07	0	9.6E-07	0.07	1.77E-10	1.32E-10	8.83E-11	4.41E-11	No
PBDEs	2,2',3,4,4',5'-HxBDE	Edge of ZID	4.94E-04	1.09E+02	4.53E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	9264	3.296	1.146	1.38E-04	4.15E-06	0	4.2E-06	0.07	7.65E-10	5.74E-10	3.83E-10	1.91E-10	No
PBDEs	2,2',3,4,4',6'-HxBDE	Edge of ZID	1.54E-04	1.09E+02	1.41E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	9264	3.296	1.146	4.31E-05	1.29E-06	0	1.3E-06	0.07	2.39E-10	1.79E-10	1.19E-10	5.96E-11	No
PBDEs	2,2',3,4,4'-PeBDE	Edge of ZID	1.82E-03	1.09E+02	1.67E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	25280	10.914	14.388	4.61E-03	1.38E-04	0	1.4E-04	0.07	2.55E-08	1.91E-08	1.27E-08	6.37E-09	No
PBDEs	2,2',4,4',5,5'-HxBDE	Edge of ZID	3.60E-03	1.09E+02	3.30E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	9264	3.296	1.146	1.01E-03	3.03E-05	0	3.0E-05	0.07	5.58E-09	4.18E-09	2.79E-09	1.39E-09	No
PBDEs	2,2',4,4',5,6'-HxBDE	Edge of ZID	3.05E-03	1.09E+02	2.80E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	9264	3.296	1.146	8.54E-04	2.56E-05	0	2.6E-05	0.07	4.72E-09	3.54E-09	2.36E-09	1.18E-09	No
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	Edge of ZID	4.06E-02	1.09E+02	3.72E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	60560	14.355	26.669	3.24E-01	9.71E-03	0	9.7E-03	0.058	2.16E-06	1.62E-06	1.08E-06	5.40E-07	No
PBDEs	2,2',4,4',6,6'-HxBDE	Edge of ZID	2.13E-04	1.09E+02	1.95E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	9264	3.296	1.146	5.97E-05	1.79E-06	0	1.8E-06	0.07	3.30E-10	2.47E-10	1.65E-10	8.25E-11	No
PBDEs	2,2',4,4',6-PeBDE	Edge of ZID	8.11E-03	1.09E+02	7.44E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	25280	10.914	14.388	2.05E-02	6.16E-04	0	6.2E-04	0.07	1.13E-07	8.51E-08	5.67E-08	2.84E-08	No
PBDEs	2,2',4,4'-TeBDE (BDE-47)	Edge of ZID	4.32E-02	1.09E+02	3.96E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	54400	14.355	26.669	3.09E-01	9.28E-03	0	9.3E-03	0.07	1.71E-06	1.28E-06	8.56E-07	4.28E-07	No
PBDEs	2,2',4,5'-TeBDE	Edge of ZID	1.56E-03	1.09E+02	1.43E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	54400	14.355	26.669	1.12E-02	3.35E-04	0	3.4E-04	0.07	6.18E-08	4.63E-08	3.09E-08	1.54E-08	No
PBDEs	2,2',4,6'-TeBDE	Edge of ZID	2.40E-04	1.09E+02	2.20E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	54400	14.355	26.669	1.72E-03	5.16E-05	0	5.2E-05	0.07	9.51E-09	7.13E-09	4.75E-09	2.38E-09	No
PBDEs	2,2',4-TriBDE	Edge of ZID	1.11E-03	1.09E+02	1.02E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	14076	9.716	13.964	1.39E-03	4.18E-05	0	4.2E-05	0.07	7.70E-09	5.77E-09	3.85E-09	1.92E-09	No
PBDEs	2,3',4,4',6-PeBDE	Edge of ZID	2.02E-04	1.09E+02	1.85E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	25280	10.914	14.388	5.11E-04	1.53E-05	0	1.5E-05	0.07	2.83E-09	2.12E-09	1.41E-09	7.07E-10	No
PBDEs	2,3',4,4'-TeBDE	Edge of ZID	1.50E-03	1.09E+02	1.38E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	54400	14.355	26.669	1.07E-02	3.22E-04	0	3.2E-04	0.07	5.94E-08	4.46E-08	2.97E-08	1.49E-08	No
PBDEs	2,3',4,6-TeBDE	Edge of ZID	5.58E-04	1.09E+02	5.12E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	54400	14.355	26.669	4.00E-03	1.20E-04	0	1.2E-04	0.07	2.21E-08	1.66E-08	1.11E-08	5.53E-09	No
PBDEs	2,4,4'-TriBDE	Edge of ZID	1.35E-03	1.09E+02	1.24E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	14076	9.716	13.964	1.69E-03	5.08E-05	0	5.1E-05	0.07	9.36E-09	7.02E-09	4.68E-09	2.34E-09	No
Pesticides	2,4'-DDD	Edge of ZID	1.07E-03	1.09E+02	9.82E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	13944	9.716	13.964	1.33E-03	3.99E-05	0	4.0E-05	0.147	3.50E-09	2.63E-09	1.75E-09	8.75E-10	No
Pesticides	4,4'-DDD	Edge of ZID	2.10E-02	1.09E+02	1.93E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	17420	10.556	15.996	3.54E-02	1.06E-03	0	1.1E-03	0.147	9.33E-08	7.00E-08	4.66E-08	2.33E-08	No
Pesticides	4,4'-DDE	Edge of ZID	4.70E-03	1.09E+02	4.31E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	36672	13.662	24.604	2.16E-02	6.48E-04	0	6.5E-04	0.147	5.69E-08	4.27E-08	2.84E-08	1.42E-08	No
Pesticides	4,4'-DDT	Edge of ZID	1.86E-04	1.09E+02	1.71E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	67360	14.388	26.669	1.65E-03	4.96E-05	0	5.0E-05	0.147	4.35E-09	3.27E-09	2.18E-09	1.09E-09	No
Pesticides	Aldrin	Edge of ZID	9.70E-04	1.09E+02	8.90E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	36120	13.662	24.604	4.39E-02	1.32E-03	0	1.3E-03	0.2	8.50E-08	6.37E-08	4.25E-08	2.12E-08	No
Pesticides	Chlordane, alpha (cis)	Edge of ZID	1.42E-04	1.09E+02	1.30E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	23604	12.064	19.907	3.71E-04	1.11E-05	0	1.1E-05	0.15	9.57E-10	7.18E-10	4.79E-10	2.39E-10	No
Pesticides	Chlorpyriphos	Edge of ZID	9.72E-04	1.09E+02	8.92E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	3480.8	3.181	2.612	9.87E-05	2.96E-06	0	3.0E-06	0.1	3.82E-10	2.87E-10	1.91E-10	9.55E-11	No
Pesticides	Chlorpyriphos-Methyl	Edge of ZID	2.11E-04	1.09E+02	1.94E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1296.4	1.491	1.178	3.74E-06	1.12E-07	0	1.1E-07	0.1	1.45E-11	1.09E-11	7.24E-12	3.62E-12	No
Pesticides	Cypermethrin	Edge of ZID	4.05E-03	1.09E+02	3.72E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	3881.2	14.388	26.669	2.07E-03	6.22E-05	0	6.2E-05	0.2	4.01E-09	3.01E-09	2.01E-09	1.00E-09	No
Pesticides	DEET	Edge of ZID	6.36E+00	1.09E+02	5.83E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	51	1.005	1	2.99E-03	8.97E-05	0	9.0E-05	1	1.16E-09	8.68E-10	5.79E-10	2.89E-10	No
Pesticides	Demeton-O,S	Edge of ZID	3.80E-02	1.09E+02	3.49E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	38.352	1	1	1.34E-05	4.01E-07	0	4.0E-07	0.008	6.47E-10	4.85E-10	3.23E-10	1.62E-10	No
Pesticides	Dieldrin	Edge of ZID	1.40E-02	1.09E+02	1.28E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	5012	4.188	3.873	2.70E-03	8.09E-05	0	8.1E-05	0.015	6.96E-08	5.22E-08	3.48E-08	1.74E-08	No
Pesticides	Endosulfan Sulfate	Edge of ZID	2.20E-02	1.09E+02	2.02E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	482.8	1.128	1.033	1.10E-04	3.30E-06	0	3.3E-06	0.058	7.33E-10	5.50E-10	3.67E-10	1.83E-10	No
Pesticides	Endrin	Edge of ZID	6.20E-05	1.09E+02	5.69E-07	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	5012	4.188	3.873	1.19E-05	3.58E-07	0	3.6E-07	0.184	2.51E-11	1.88E-11	1.26E-11	6.28E-12	No
Pesticides	Endrin Ketone	Edge of ZID	9.60E-03	1.09E+02	8.81E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	3623.2	3.181	2.612	1.02E-03	3.05E-05	0	3.0E-05	0.184	2.13E-09	1.60E-09	1.07E-09	5.34E-10	No
Pesticides	HCH, alpha	Edge of ZID	6.60E-05	1.09E+02	6.06E-07	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1001.6	1.315	1.096	7.98E-07	2.39E-08	0	2.4E-08	87	3.55E-15	2.66E-15	1.77E-15	8.87E-16	No
Pesticides	HCH, beta	Edge of ZID	1.09E-04	1.09E+02	1.00E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1001.6	1.315	1.096	1.32E-06	3.95E-08	0	4.0E-08	0.4	1.27E-12	9.56E-13	6.37E-13	3.19E-13	No
Pesticides	HCH, gamma	Edge of ZID	6.96E-04	1.09E+02	6.39E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1001.6	1.315	1.096	8.41E-06	2.52E-07	0	2.5E-07	0.014	2.32E-10	1.74E-10	1.16E-10	5.81E-11	No
Pesticides	Heptachlor	Edge of ZID	1.40E-02	1.09E+02	1.28E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	7552	6.266	7.079	6.08E-03	1.82E-04	0	1.8E-04	0.2	1.18E-08	8.82E-09	5.88E-09	2.94E-09	No
Pesticides	Hexachlorobenzene	Edge of ZID	5.17E-04	1.09E+02	4.74E-06	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	11212	7.962	10.209	4.23E-04	1.27E-05	0	1.3E-05	7.1	2.31E-11	1.73E-11	1.15E-11	5.77E-12	No
Pesticides	Malathion	Edge of ZID	5.20E-01	1.09E+02	4.77E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	67	1.01	1.002	3.23E-04	9.68E-06	0	9.7E-06	0.046	2.72E-09	2.04E-09	1.36E-09	6.79E-10	No
Pesticides	Methoxychlor	Edge of ZID	2.90E-03	1.09E+02	2.66E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	4176	3.643	3.162	4.05E-04	1.21E-05	0	1.2E-05	1.002	1.56E-10	1.17E-10	7.82E-11	3.91E-11	No
Pesticides	Permethrin	Edge of ZID	4.23E-02	1.09E+02	3.88E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1989.2	13.662	24.604	1.05E-02	3.16E-04	0	3.2E-04	5	8.16E-10	6.12E-10	4.08E-10	2.04E-10	No
PFAS	5:3 FTCA	Edge of ZID	5.92E-02	1.09E+02	5.43E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1.766	1.334	1.21E-05	3.64E-07	0	3.6E-07	5	9.39E-13	7.04E-13	4.69E-13	2.35E-13	No
PFAS	PFBA	Edge of ZID	1.49E-02	1.09E+02	1.37E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1.005	1	1.74E-06	5.21E-08	0	5.2E-08	35	1.92E-14	1.44E-14	9.61E-15	4.80E-15	No
PFAS	PFHpA	Edge of ZID	8.47E-03	1.09E+02	7.77E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1.315	1.096	1.29E-06	3.88E-08	0	3.9E-08	--	--	--	--	--	--	Uncertainty
PFAS	PFHxA	Edge of ZID	2.55E-02	1.09E+02	2.34E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1.083	1.019	3.20E-06	9.61E-08	0	9.6E-08	20	6.20E-14	4.65E-14	3.10E-14	1.55E-14	No
PFAS	PFHxS	Edge of ZID	3.96E-02	1.09E+02	3.63E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1.042	1.009	4.79E-06	1.44E-07	0	1.4E-07	5.72	3.24E-13	2.43E-13	1.62E-13	8.10E-14	No
PFAS	PFNA	Edge of ZID	5.14E-03	1.09E+02	4.72E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	40	6.266	7.079	1.18E-05	3.55E-07	0	3.5E-07	0.166	2.76E-11	2.07E-11	1.38E-11	6.89E-12	No
PFAS	PFOA	Edge of ZID	1.85E-02	1.09E+02	1.70E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	2.452	1.871	5.26E-06	1.58E-07	0	1.6E-07	1.75	1.16E-12	8.73E-13	5.82E-13	2.91E-13	No
PFAS	PFOS	Edge of ZID	6.53E-02	1.09E+02	5.99E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1.766	1.334	1.34E-05	4.01E-07	0	4.0E-07	0.12	4.32E-11	3.24E-11	2.16E-11	1.08E-11	No
PFAS	PFPeA	Edge of ZID	2.03E-02	1.09E+02	1.86E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1.028	1.007	2.42E-06	7.26E-08	0	7.3E-08	--	--	--	--	--	--	Uncertainty
PFAS	PFPeS	Edge of ZID	3.84E-03	1.09E+02	3.52E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1.01	1.002	4.50E-07	1.35E-08	0	1.4E-08	--	--	--	--	--	--	Uncertainty
Plasticizer	Bisphenol A	Edge of ZID	1.59E+00	1.09E+02	1.46E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	288.12	1.053	1.012	4.43E-03	1.33E-04	0	1.3E-04	10	1.71E-10	1.28E-10	8.56E-11	4.28E-11	No
Plasticizer	Bisphenol S	Edge of ZID	8.88E-01	1.09E+02	8.15E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	22.672	1	1	1.85E-04	5.54E-06	0	5.5E-06	10	7.15E-12	5.36E-12	3.57E-12	1.79E-12	No
Pyrimidine antibiotic	Trimethoprim	Edge of ZID	7.11E-01	1.09E+02	6.52E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	8.25E-05	2.48E-06	0	2.5E-06	0.8	3.99E-11	2.99E-11	2.00E-11	9.98E-12	No
Quinoline antibiotic	Ciprofloxacin	Edge of ZID	3.72E-01	1.09E+02	3.41E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	4.32E-05	1.29E-06	0	1.3E-06	4	4.18E-12	3.13E-12	2.09E-12	1.04E-12	No
Quinoline antibiotic	Ofloxacin	Edge of ZID	4.27E-01	1.09E+02	3.92E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	4.95E-05	1.49E-06	0	1.5E-06	2	9.59E-12	7.19E-12	4.79E-12	2.40E-12	No
Rubber Stabilizing compound	6PPD-Quinone	Edge of ZID	5.30E-03	1.09E+02	4.86E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	781.6	1.253	1.072	4.76E-05	1.43E-06	0	1.4E-06	2	9.21E-12	6.91E-12	4.61E-12	2.30E-12	No
Sex hormone	17 beta-Estradiol	Edge of ZID	5.52E-03	1.09E+02	5.06E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	822	1.253	1.072	5.22E-05	1.56E-06	0	1.6E-06	0.01	2.02E-09	1.51E-09	1.01E-09	5.05E-10	No
Sex hormone	Estrone	Edge of ZID	3.31E-02	1.09E+02	3.04E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	215.88	1.034	1.007	6.78E-05	2.03E-06	0	2.0E-06	--	--	--	--	--	--	Uncertainty
Sex hormone	Progesterone	Edge of ZID	5.66E-02	1.09E+02	5.19E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	664.4	1.202	1.054	4.15E-04	1.24E-05	0	1.2E-05	0.66	2.43E-10	1.82E-10	1.22E-10	6.08E-11	No
Sex hormone	Testosterone	Edge of ZID	7.17E-02	1.09E+02	6.58E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	288.12	1.053	1.012	2.00E-04	5.99E-06	0	6.0E-06	1.72	4.49E-11	3.37E-11	2.25E-11	1.12E-11	No
SSRI Antidepressant	Fluoxetine	Edge of ZID	5.20E-02	1.09E+02	4.77E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	616	1.161	1.042	3.41E-04	1.02E-05	0	1.0E-05	1.136	1.16E-10	8.72E-11	5.81E-11	2.91E-11	No
SSRI Antidepressant	Norfluoxetine	Edge of ZID	2.73E-02	1.09E+02	2.50E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1068	1.38	1.13	3.69E-04	1.11E-05	0	1.1E-05	--	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Paroxetine	Edge of ZID	1.88E-02	1.09E+02	1.72E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	754.4	1.253	1.072	1.63E-04	4.89E-06	0	4.9E-06	--	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Sertraline	Edge of ZID	1.08E-01	1.09E+02	9.91E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	5716	4.803	4.742	2.72E-02	8.16E-04	0	8.2E-04	--	--	--	--	--	--	Uncertainty
Statin	Atorvastatin	Edge of ZID	2.20E-01	1.09E+02	2.02E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	224.92	13.228	23.281	6.01E-03	1.80E-04	0	1.8E-04	20	1.16E-10	8.71E-11	5.81E-11	2.90E-11	No
Steroid	Methylprednisolone	Edge of ZID	1.13E-01	1.09E+02	1.04E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	29.396	1	1	3.05E-05	9.14E-07	0	9.1E-07	8	1.47E-12	1.11E-12	7.37E-13	3.69E-13	No
Steroid	Prednisolone	Edge of ZID	9.31E-03	1.09E+02	8.54E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	21.772	1	1	1.86E-06	5.58E-08	0	5.6E-08	6.72	1.07E-13	8.03E-14	5.35E-14	2.68E-14	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
Steroidal Estrogen	Equilenin	Edge of ZID	1.34E-02	1.09E+02	1.23E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	726.4	1.202	1.054	1.07E-04	3.22E-06	0	3.2E-06	--	--	--	--	--	Uncertainty
Stimulant	Amphetamine	Edge of ZID	5.39E-01	1.09E+02	4.94E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	26.936	1	1	1.33E-04	4.00E-06	0	4.0E-06	0.12	4.30E-10	3.22E-10	2.15E-10	1.07E-10	No
Stimulant	Caffeine	Edge of ZID	1.05E+02	1.09E+02	9.63E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.22E-02	3.66E-04	0	3.7E-04	0.508	9.28E-09	6.96E-09	4.64E-09	2.32E-09	No
Stimulant	Cocaine	Edge of ZID	7.68E-01	1.09E+02	7.05E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	61.16	1.01	1.002	4.35E-04	1.31E-05	0	1.3E-05	0.396	4.25E-10	3.19E-10	2.13E-10	1.06E-10	No
Streoid	Prednisone	Edge of ZID	4.04E-01	1.09E+02	3.71E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	17.076	1	1	6.33E-05	1.90E-06	0	1.9E-06	--	--	--	--	--	Uncertainty
Sulfonamide antibiotic	Sulfadiazine	Edge of ZID	1.46E-03	1.09E+02	1.34E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.69E-07	5.08E-09	0	5.1E-09	6	1.09E-14	8.20E-15	5.46E-15	2.73E-15	No
Sulfonamide antibiotic	Sulfamethizole	Edge of ZID	5.11E-03	1.09E+02	4.69E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	5.93E-07	1.78E-08	0	1.8E-08	14	1.64E-14	1.23E-14	8.20E-15	4.10E-15	No
Sulfonamide antibiotic	Sulfamethoxazole	Edge of ZID	1.08E+00	1.09E+02	9.91E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.25E-04	3.76E-06	0	3.8E-06	9.2	5.27E-12	3.95E-12	2.64E-12	1.32E-12	No
Sulfonamide antibiotic	Sulfanilamide	Edge of ZID	3.48E-02	1.09E+02	3.19E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	4.04E-06	1.21E-07	0	1.2E-07	12	1.30E-13	9.77E-14	6.51E-14	3.26E-14	No
SVOCs/PAHs	1,2-Diphenylhydrazine	Edge of ZID	2.50E+00	1.09E+02	2.29E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	161.76	1.028	1.007	3.81E-03	1.14E-04	0	1.1E-04	--	--	--	--	--	Uncertainty
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	Edge of ZID	1.00E-01	1.09E+02	9.17E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	2775.2	2.452	1.871	6.24E-03	1.87E-04	0	1.9E-04	65.6	3.68E-11	2.76E-11	1.84E-11	9.21E-12	No
SVOCs/PAHs	1-Methyldibenzothiophene	Edge of ZID	5.00E-02	1.09E+02	4.59E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	2390	2.175	1.633	2.38E-03	7.15E-05	0	7.2E-05	65.6	1.41E-11	1.06E-11	7.03E-12	3.52E-12	No
SVOCs/PAHs	1-Methylfluorene	Edge of ZID	5.00E-02	1.09E+02	4.59E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	3534	3.181	2.612	5.16E-03	1.55E-04	0	1.5E-04	65.6	3.04E-11	2.28E-11	1.52E-11	7.61E-12	No
SVOCs/PAHs	1-Methylnaphthalene	Edge of ZID	4.27E-01	1.09E+02	3.92E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	664.4	1.202	1.054	3.13E-03	9.39E-05	0	9.4E-05	0.94	1.29E-09	9.66E-10	6.44E-10	3.22E-10	No
SVOCs/PAHs	1-Methylphenanthrene	Edge of ZID	2.85E-02	1.09E+02	2.61E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	19132	3.643	3.162	1.82E-02	5.47E-04	0	5.5E-04	65.6	1.08E-10	8.06E-11	5.38E-11	2.69E-11	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Edge of ZID	1.20E+00	1.09E+02	1.10E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	505.6	1.128	1.033	6.28E-03	1.88E-04	0	1.9E-04	3	8.10E-10	6.07E-10	4.05E-10	2.02E-10	No
SVOCs/PAHs	2,6-Dimethylnaphthalene	Edge of ZID	3.44E-01	1.09E+02	3.16E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1296.4	1.491	1.178	6.10E-03	1.83E-04	0	1.8E-04	65.6	3.60E-11	2.70E-11	1.80E-11	9.00E-12	No
SVOCs/PAHs	2-Methylanthracene	Edge of ZID	6.36E-02	1.09E+02	5.83E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	3698.8	3.181	2.612	6.87E-03	2.06E-04	0	2.1E-04	65.6	4.05E-11	3.04E-11	2.03E-11	1.01E-11	No
SVOCs/PAHs	2-Methylfluoranthene	Edge of ZID	1.74E-02	1.09E+02	1.60E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	7672	6.266	7.079	7.67E-03	2.30E-04	0	2.3E-04	65.6	4.53E-11	3.40E-11	2.26E-11	1.13E-11	No
SVOCs/PAHs	2-Methylnaphthalene	Edge of ZID	5.41E-01	1.09E+02	4.96E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	654.4	1.202	1.054	3.90E-03	1.17E-04	0	1.2E-04	65.6	2.30E-11	1.73E-11	1.15E-11	5.76E-12	No
SVOCs/PAHs	2-Methylphenanthrene	Edge of ZID	6.47E-02	1.09E+02	5.94E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	13696	2.78	2.193	2.26E-02	6.78E-04	0	6.8E-04	65.6	1.33E-10	1.00E-10	6.67E-11	3.33E-11	No
SVOCs/PAHs	3,6-Dimethylphenanthrene	Edge of ZID	1.89E-02	1.09E+02	1.73E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	33036	5.502	5.821	3.15E-02	9.46E-04	0	9.5E-04	65.6	1.86E-10	1.39E-10	9.30E-11	4.65E-11	No
SVOCs/PAHs	3-Methylphenanthrene	Edge of ZID	5.79E-02	1.09E+02	5.31E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	13696	2.78	2.193	2.02E-02	6.07E-04	0	6.1E-04	65.6	1.19E-10	8.95E-11	5.97E-11	2.98E-11	No
SVOCs/PAHs	4-Methyldibenzothiophene	Edge of ZID	2.29E-02	1.09E+02	2.10E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	2390	2.175	1.633	1.09E-03	3.28E-05	0	3.3E-05	65.6	6.44E-12	4.83E-12	3.22E-12	1.61E-12	No
SVOCs/PAHs	Acenaphthene	Edge of ZID	8.21E-02	1.09E+02	7.53E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	716.8	1.202	1.054	6.49E-04	1.95E-05	0	1.9E-05	65.6	3.83E-12	2.87E-12	1.91E-12	9.57E-13	No
SVOCs/PAHs	Acenaphthylene	Edge of ZID	1.25E-02	1.09E+02	1.15E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	739.2	1.202	1.054	1.02E-04	3.06E-06	0	3.1E-06	65.6	6.01E-13	4.51E-13	3.01E-13	1.50E-13	No
SVOCs/PAHs	Anthracene	Edge of ZID	5.53E-02	1.09E+02	5.07E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1604	1.766	1.334	1.44E-03	4.31E-05	0	4.3E-05	65.6	8.48E-12	6.36E-12	4.24E-12	2.12E-12	No
SVOCs/PAHs	Benz(a)anthracene	Edge of ZID	2.50E-01	1.09E+02	2.29E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	11736	8.841	12.05	2.38E-01	7.14E-03	0	7.1E-03	0.62	1.49E-07	1.11E-07	7.43E-08	3.71E-08	No
SVOCs/PAHs	Benzo(a)fluoranthene	Edge of ZID	1.51E-02	1.09E+02	1.39E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12096	8.841	12.05	1.48E-02	4.44E-04	0	4.4E-04	0.615	9.32E-09	6.99E-09	4.66E-09	2.33E-09	No
SVOCs/PAHs	Benzo(a)pyrene	Edge of ZID	5.63E-02	1.09E+02	5.17E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	20588	11.337	17.783	1.21E-01	3.62E-03	0	3.6E-03	0.62	7.53E-08	5.64E-08	3.76E-08	1.88E-08	No
SVOCs/PAHs	Benzo(b)fluoranthene	Edge of ZID	4.90E-02	1.09E+02	4.50E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12096	8.841	12.05	4.81E-02	1.44E-03	0	1.4E-03	0.62	3.00E-08	2.25E-08	1.50E-08	7.50E-09	No
SVOCs/PAHs	Benzo(b)fluorene	Edge of ZID	4.06E-02	1.09E+02	3.72E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	11916	8.841	12.05	3.92E-02	1.18E-03	0	1.2E-03	0.615	2.47E-08	1.85E-08	1.23E-08	6.17E-09	No
SVOCs/PAHs	Benzo(e)pyrene	Edge of ZID	5.23E-02	1.09E+02	4.80E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	32976	13.228	23.281	2.09E-01	6.28E-03	0	6.3E-03	0.615	1.32E-07	9.88E-08	6.59E-08	3.29E-08	No
SVOCs/PAHs	Benzo(g,h,i)perylene	Edge of ZID	8.33E-02	1.09E+02	7.64E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	44000	13.98	25.645	4.70E-01	1.41E-02	0	1.4E-02	14.4	1.26E-08	9.48E-09	6.32E-09	3.16E-09	No
SVOCs/PAHs	Benzo(k,j)fluoranthene	Edge of ZID	3.34E-02	1.09E+02	3.06E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	19972	11.337	17.783	6.94E-02	2.08E-03	0	2.1E-03	0.615	4.37E-08	3.27E-08	2.18E-08	1.09E-08	No
SVOCs/PAHs	Benzothiophene	Edge of ZID	1.44E-02	1.09E+02	1.32E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	212.64	1.034	1.007	2.90E-05	8.71E-07	0	8.7E-07	0.615	1.83E-11	1.37E-11	9.14E-12	4.57E-12	No
SVOCs/PAHs	Biphenyl	Edge of ZID	1.02E-01	1.09E+02	9.36E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	822	1.253	1.072	9.64E-04	2.89E-05	0	2.9E-05	0.615	6.07E-10	4.55E-10	3.03E-10	1.52E-10	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Edge of ZID	9.50E+01	1.09E+02	8.72E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	6848	11.708	16.749	6.99E+01	2.10E+00	0	2.1E+00	18.3	1.48E-06	1.11E-06	7.39E-07	3.69E-07	No
SVOCs/PAHs	Butyl Benzyl Phthalate	Edge of ZID	5.62E+00	1.09E+02	5.16E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	2454.4	2.175	1.633	2.75E-01	8.26E-03	0	8.3E-03	159	6.70E-10	5.02E-10	3.35E-10	1.67E-10	No
SVOCs/PAHs	Carbazole	Edge of ZID	2.01E-01	1.09E+02	1.84E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	529.2	1.128	1.033	1.10E-03	3.30E-05	0	3.3E-05	0.615	6.93E-10	5.20E-10	3.46E-10	1.73E-10	No
SVOCs/PAHs	Chrysene/Triphenylene	Edge of ZID	6.14E-02	1.09E+02	5.63E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12660	8.841	12.05	6.30E-02	1.89E-03	0	1.9E-03	0.615	3.97E-08	2.98E-08	1.98E-08	9.92E-09	No
SVOCs/PAHs	cis/trans Decalin	Edge of ZID	4.84E-01	1.09E+02	4.44E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1091.2	1.38	1.13	6.69E-03	2.01E-04	0	2.0E-04	16.68	1.55E-10	1.16E-10	7.76E-11	3.88E-11	No
SVOCs/PAHs	Dibenzo(a,h)anthracene	Edge of ZID	6.68E-03	1.09E+02	6.13E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	38384	13.662	24.604	3.21E-02	9.64E-04	0	9.6E-04	2.66	4.68E-09	3.51E-09	2.34E-09	1.17E-09	No
SVOCs/PAHs	Dibenzofuran	Edge of ZID	6.98E-02	1.09E+02	6.40E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	971.6	1.315	1.096	8.18E-04	2.45E-05	0	2.5E-05	0.615	5.15E-10	3.86E-10	2.57E-10	1.29E-10	No
SVOCs/PAHs	Dibenzothiophene	Edge of ZID	3.35E-02	1.09E+02	3.07E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1442	1.614	1.242	7.15E-04	2.15E-05	0	2.1E-05	1.04	2.66E-10	2.00E-10	1.33E-10	6.65E-11	No
SVOCs/PAHs	Diethyl Phthalate	Edge of ZID	3.70E+00	1.09E+02	3.39E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	73.4	1.01	1.002	2.52E-03	7.55E-05	0	7.5E-05	4600	2.12E-13	1.59E-13	1.06E-13	5.29E-14	No
SVOCs/PAHs	Dimethyl Phthalate	Edge of ZID	1.20E-01	1.09E+02	1.10E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	21.124	1	1	2.33E-05	6.98E-07	0	7.0E-07	68	1.32E-13	9.93E-14	6.62E-14	3.31E-14	No
SVOCs/PAHs	Di-n-butyl Phthalate	Edge of ZID	8.40E-01	1.09E+02	7.71E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1730.4	1.766	1.334	2.35E-02	7.06E-04	0	7.1E-04	1340	6.80E-12	5.10E-12	3.40E-12	1.70E-12	No
SVOCs/PAHs	Di-n-octyl Phthalate	Edge of ZID	1.89E+01	1.09E+02	1.73E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	3895.6	7.278	6.012	4.92E+00	1.47E-01	0	1.5E-01	36.8	5.17E-08	3.88E-08	2.58E-08	1.29E-08	No
SVOCs/PAHs	Fluoranthene	Edge of ZID	3.17E-01	1.09E+02	2.91E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	4716	4.188	3.873	5.74E-02	1.72E-03	0	1.7E-03	125	1.78E-10	1.33E-10	8.89E-11	4.45E-11	No
SVOCs/PAHs	Fluorene	Edge of ZID	1.26E-01	1.09E+02	1.16E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	1064.4	1.38	1.13	1.70E-03	5.09E-05	0	5.1E-05	125	5.26E-12	3.94E-12	2.63E-12	1.31E-12	No
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	Edge of ZID	4.44E-02	1.09E+02	4.07E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	48720	14.223	26.363	2.82E-01	8.47E-03	0	8.5E-03	7.2	1.52E-08	1.14E-08	7.59E-09	3.79E-09	No
SVOCs/PAHs	Isophorone	Edge of ZID	3.80E-01	1.09E+02	3.49E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	24.588	1	1	8.57E-05	2.57E-06	0	2.6E-06	150	2.21E-13	1.66E-13	1.11E-13	5.53E-14	No
SVOCs/PAHs	Naphthalene	Edge of ZID	9.80E-01	1.09E+02	8.99E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	279.52	1.053	1.012	2.65E-03	7.94E-05	0	7.9E-05	71	1.44E-11	1.08E-11	7.21E-12	3.61E-12	No
SVOCs/PAHs	Naphthobenzothiophene	Edge of ZID	3.37E-02	1.09E+02	3.09E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	4936	4.188	3.873	6.39E-03	1.92E-04	0	1.9E-04	0.615	4.02E-09	3.02E-09	2.01E-09	1.01E-09	No
SVOCs/PAHs	N-Nitrosodimethylamine	Edge of ZID	9.60E+00	1.09E+02	8.81E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.11E-03	3.34E-05	0	3.3E-05	0.005	8.62E-08	6.47E-08	4.31E-08	2.16E-08	No
SVOCs/PAHs	Pentachlorophenol (PCP)	Edge of ZID	6.30E+00	1.09E+02	5.78E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	4440	3.643	3.162	9.35E-01	2.80E-02	0	2.8E-02	8.42	4.30E-08	3.22E-08	2.15E-08	1.07E-08	No
SVOCs/PAHs	Perylene	Edge of ZID	3.33E-02	1.09E+02	3.06E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	24708	12.691	21.677	9.58E-02	2.87E-03	0	2.9E-03	0.615	6.03E-08	4.52E-08	3.01E-08	1.51E-08	No
SVOCs/PAHs	Phenanthrene	Edge of ZID	9.80E-01	1.09E+02	8.99E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	7460	1.766	1.334	1.18E-01	3.55E-03	0	3.6E-03	65.6	6.99E-10	5.24E-10	3.49E-10	1.75E-10	No
SVOCs/PAHs	Phenol	Edge of ZID	5.45E+01	1.09E+02	5.00E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	17.076	1	1	8.54E-03	2.56E-04	0	2.6E-04	60	5.51E-11	4.13E-11	2.75E-11	1.38E-11	No
SVOCs/PAHs	Pyrene	Edge of ZID	4.70E-01	1.09E+02	4.31E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	3082.4	2.78	2.193	3.69E-02	1.11E-03	0	1.1E-03	0.615	2.33E-08	1.74E-08	1.16E-08	5.81E-09	No
SVOCs/PAHs	Retene	Edge of ZID	1.08E-02	1.09E+02	9.91E-05	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	131400	12.691	21.677	1.65E-01	4.96E-03	0	5.0E-03	65.6	9.75E-10	7.31E-10	4.87E-10	2.44E-10	No
Tetracycline antibiotic	Doxycycline	Edge of ZID	1.50E-01	1.09E+02	1.38E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.74E-05	5.22E-07	0	5.2E-07	4.0298	1.67E-12	1.25E-12	8.36E-13	4.18E-13	No
Tetracycline antibiotic	Tetracycline [TC]	Edge of ZID	9.79E-02	1.09E+02	8.98E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.14E-05	3.41E-07	0	3.4E-07	6.4	6.87E-13	5.15E-13	3.43E-13	1.72E-13	No
Tranquilizer	Meprobamate	Edge of ZID	3.83E-01	1.09E+02	3.51E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	4.44E-05	1.33E-06	0	1.3E-06	3	5.73E-12	4.30E-12	2.87E-12	1.43E-12	No
Urinary steroid	Androsterone	Edge of ZID	5.71E-02	1.09E+02	5.24E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	505.6	1.128	1.033	2.99E-04	8.96E-06	0	9.0E-06	200	5.78E-13	4.34E-13	2.89E-13	1.45E-13	No
VOCs	1,1,1-Trichloroethane (TCA)	Edge of ZID	7.90E-01	1.09E+02	7.25E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	81.64	1.01	1.002	5.98E-04	1.79E-05	0	1.8E-05	999	2.32E-13	1.74E-13	1.16E-13	5.79E-14	No
VOCs	1,2-Dichloroethane (EDC)	Edge of ZID	8.00E-02	1.09E+02	7.34E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	17.604	1	1	1.29E-05	3.88E-07	0	3.9E-07	382	1.31E-14	9.82E-15	6.54E-15	3.27E-15	No
VOCs	1,4-Dichlorobenzene	Edge of ZID	8.40E-01	1.09E+02	7.71E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	345.76	1.067	1.014	2.84E-03	8.53E-05	0	8.5E-05	2.5	4.40E-10	3.30E-10	2.20E-10	1.10E-10	No
VOCs	2-Butanone (MEK)	Edge of ZID	6.80E+01	1.09E+02	6.24E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	7.89E-03	2.37E-04	0	2.4E-04	1771	1.72E-12	1.29E-12	8.62E-13	4.31E-13	No
VOCs	2-Hexanone	Edge of ZID	5.70E+00	1.09E+02	5.23E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	15.12	1	1	7.91E-04	2.37E-05	0	2.4E-05	8.27	3.70E-11	2.78E-11	1.85E-11	9.25E-12	No
VOCs	Acetone	Edge of ZID	3.00E+02	1.09E+02	2.75E+00	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	3.48E-02	1.04E-03	0	1.0E-03	20	6.74E-10	5.05E-10	3.37E-10	1.68E-10	No
VOCs	Acrolein	Edge of ZID	1.30E+00	1.09E+02	1.19E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	1.51E-04	4.53E-06	0	4.5E-06	0.05	1.17E-09	8.76E-10	5.84E-10	2.92E-10	No
VOCs	Benzene	Edge of ZID	7.80E-01	1.09E+02	7.16E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	47.24	1.005	1	3.40E-04	1.02E-05	0	1.0E-05	26.36	4.99E-12	3.74E-12	2.49E-12	1.25E-12	No
VOCs	Bromodichloromethane	Edge of ZID	8.00E-02	1.09E+02	7.34E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	38.784	1.005	1	2.86E-05	8.58E-07	0	8.6E-07	3.58	3.09E-12	2.32E-12	1.55E-12	7.73E-13	No
VOCs	Bromomethane	Edge of ZID	9.00E-02	1.09E+02	8.26E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	11.328	1	1	9.35E-06	2.81E-07	0	2.8E-07	0.284	1.27E-11	9.56E-12	6.37E-12	3.19E-12	No
VOCs	Carbon Disulfide	Edge of ZID	7.00E-01	1.09E+02	6.42E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	35.404	1	1	2.27E-04	6.82E-06	0	6.8E-06	11	8.00E-12	6.00E-12	4.00E-12	2.00E-12	No
VOCs	Chlorobenzene	Edge of ZID	8.00E-02	1.09E+02	7.34E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	138.96	1.028	1.007	1.05E-04	3.15E-06	0	3.1E-06	19	2.14E-12	1.60E-12	1.07E-12	5.34E-13	No
VOCs	Chloroethane	Edge of ZID	6.90E-01	1.09E+02	6.33E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	16.316	1	1	1.03E-04	3.10E-06	0	3.1E-06	--	--	--	--	--	Uncertainty
VOCs	Chloroform	Edge of ZID	3.95E+00	1.09E+02	3.62E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	37.056	1	1	1.34E-03	4.03E-05	0	4.0E-05	2.58	2.01E-10	1.51E-10	1.01E-10	5.04E-11	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
VOCs	Chloromethane	Edge of ZID	1.90E+00	1.09E+02	1.74E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.648	1	1	2.20E-04	6.61E-06	0	6.6E-06	3.2	2.67E-11	2.00E-11	1.33E-11	6.67E-12	No
VOCs	cis-1,2-Dichloroethene	Edge of ZID	7.00E-02	1.09E+02	6.42E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	38.784	1.005	1	2.50E-05	7.51E-07	0	7.5E-07	90.4	1.07E-13	8.04E-14	5.36E-14	2.68E-14	No
VOCs	Dichloromethane (Methylene Chlori	Edge of ZID	6.85E+00	1.09E+02	6.28E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	12.412	1	1	7.80E-04	2.34E-05	0	2.3E-05	5.85	5.16E-11	3.87E-11	2.58E-11	1.29E-11	No
VOCs	Ethylbenzene	Edge of ZID	1.50E+00	1.09E+02	1.38E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	222.56	1.042	1.009	3.19E-03	9.57E-05	0	9.6E-05	97.1	1.27E-11	9.54E-12	6.36E-12	3.18E-12	No
VOCs	m,p-Xylenes	Edge of ZID	6.20E+00	1.09E+02	5.69E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	226	1.042	1.009	1.34E-02	4.02E-04	0	4.0E-04	2.1	2.47E-09	1.85E-09	1.23E-09	6.17E-10	No
VOCs	o-Xylene	Edge of ZID	2.60E+00	1.09E+02	2.39E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	225.96	1.042	1.009	5.62E-03	1.68E-04	0	1.7E-04	2.1	1.03E-09	7.76E-10	5.17E-10	2.59E-10	No
VOCs	Styrene	Edge of ZID	5.50E+00	1.09E+02	5.05E-02	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	164.24	1.028	1.007	8.52E-03	2.56E-04	0	2.6E-04	200	1.65E-11	1.24E-11	8.24E-12	4.12E-12	No
VOCs	Tetrachloroethene (PCE)	Edge of ZID	6.00E-01	1.09E+02	5.50E-03	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	325.36	1.067	1.014	1.91E-03	5.73E-05	0	5.7E-05	63	1.17E-11	8.80E-12	5.87E-12	2.93E-12	No
VOCs	Toluene	Edge of ZID	1.60E+01	1.09E+02	1.47E-01	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	117.56	1.01	1.002	1.74E-02	5.23E-04	0	5.2E-04	26	2.59E-10	1.95E-10	1.30E-10	6.49E-11	No
VOCs	Trichloroethene (TCE)	Edge of ZID	7.00E-02	1.09E+02	6.42E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	73.4	1.01	1.002	4.76E-05	1.43E-06	0	1.4E-06	2.8	6.58E-12	4.94E-12	3.29E-12	1.65E-12	No
VOCs	Vinyl Chloride	Edge of ZID	2.00E-02	1.09E+02	1.83E-04	Beluga Whale	1428	0.03	0	0.000013	1	1	0	model	21.884	1	1	4.02E-06	1.20E-07	0	1.2E-07	0.17	9.14E-12	6.86E-12	4.57E-12	2.29E-12	No
Metals	Antimony	Edge of ZID	9.04E-01	1.09E+02	8.29E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	4	1	1	3.32E-05	2.65E-06	0	2.7E-06	0.059	2.55E-08	1.91E-08	1.28E-08	6.38E-09	No
Metals	Arsenic	Edge of ZID	3.42E+00	1.09E+02	3.14E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	176	1	1	5.52E-03	4.42E-04	0	4.4E-04	1.04	2.41E-07	1.81E-07	1.20E-07	6.02E-08	No
Metals	Beryllium	Edge of ZID	1.80E-02	1.09E+02	1.65E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	76	1	1	1.26E-05	1.00E-06	0	1.0E-06	0.532	1.07E-09	8.03E-10	5.35E-10	2.68E-10	No
Metals	Cadmium	Edge of ZID	3.09E-01	1.09E+02	2.83E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	152	1	1	4.31E-04	3.45E-05	0	3.4E-05	0.77	2.54E-08	1.90E-08	1.27E-08	6.35E-09	No
Metals	Chromium	Edge of ZID	3.46E+00	1.09E+02	3.17E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	64	1	1	2.03E-03	1.63E-04	0	1.6E-04	2.4	3.84E-08	2.88E-08	1.92E-08	9.60E-09	No
Metals	Copper	Edge of ZID	1.15E+02	1.09E+02	1.06E+00	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	144	1	1	1.52E-01	1.22E-02	0	1.2E-02	5.6	1.23E-06	9.23E-07	6.15E-07	3.08E-07	No
Metals	Dissolved Antimony	Edge of ZID	8.06E-01	1.09E+02	7.39E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	4	1	1	2.96E-05	2.37E-06	0	2.4E-06	0.059	2.27E-08	1.71E-08	1.14E-08	5.69E-09	No
Metals	Dissolved Arsenic	Edge of ZID	2.78E+00	1.09E+02	2.55E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	176	1	1	4.49E-03	3.59E-04	0	3.6E-04	1.04	1.96E-07	1.47E-07	9.79E-08	4.89E-08	No
Metals	Dissolved Beryllium	Edge of ZID	4.00E-03	1.09E+02	3.67E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	76	1	1	2.79E-06	2.23E-07	0	2.2E-07	0.532	2.38E-10	1.78E-10	1.19E-10	5.95E-11	No
Metals	Dissolved Cadmium	Edge of ZID	2.10E-01	1.09E+02	1.93E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	152	1	1	2.93E-04	2.34E-05	0	2.3E-05	0.77	1.73E-08	1.29E-08	8.63E-09	4.31E-09	No
Metals	Dissolved Chromium	Edge of ZID	3.63E+00	1.09E+02	3.33E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	64	1	1	2.13E-03	1.71E-04	0	1.7E-04	2.4	4.03E-08	3.02E-08	2.01E-08	1.01E-08	No
Metals	Dissolved Copper	Edge of ZID	4.18E+01	1.09E+02	3.83E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	144	1	1	5.52E-02	4.42E-03	0	4.4E-03	5.6	4.47E-07	3.35E-07	2.24E-07	1.12E-07	No
Metals	Dissolved Lead	Edge of ZID	1.54E+00	1.09E+02	1.41E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.79E-04	1.43E-05	0	1.4E-05	4.7	1.72E-09	1.29E-09	8.62E-10	4.31E-10	No
Metals	Dissolved Mercury	Edge of ZID	8.94E-02	1.09E+02	8.20E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	25036	2.52	12.6	5.17E-02	4.14E-03	0	4.1E-03	1.41	1.66E-06	1.25E-06	8.32E-07	4.16E-07	No
Metals	Dissolved Molybdenum	Edge of ZID	4.76E+01	1.09E+02	4.37E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	5.52E-03	4.42E-04	0	4.4E-04	0.52	4.82E-07	3.61E-07	2.41E-07	1.20E-07	No
Metals	Dissolved Nickel	Edge of ZID	9.49E+00	1.09E+02	8.71E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	188	1	1	1.64E-02	1.31E-03	0	1.3E-03	1.7	4.37E-07	3.28E-07	2.18E-07	1.09E-07	No
Metals	Dissolved Selenium	Edge of ZID	1.00E+00	1.09E+02	9.17E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.16E-04	9.28E-06	0	9.3E-06	0.143	3.68E-08	2.76E-08	1.84E-08	9.20E-09	No
Metals	Dissolved Silver	Edge of ZID	4.22E-01	1.09E+02	3.87E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	4.90E-05	3.92E-06	0	3.9E-06	6.02	3.69E-10	2.77E-10	1.84E-10	9.22E-11	No
Metals	Dissolved Thallium	Edge of ZID	3.20E-02	1.09E+02	2.94E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	3.71E-06	2.97E-07	0	3.0E-07	0.096	1.75E-09	1.32E-09	8.77E-10	4.39E-10	No
Metals	Dissolved Zinc	Edge of ZID	1.24E+02	1.09E+02	1.14E+00	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	188	1	1	2.14E-01	1.71E-02	0	1.7E-02	75.4	1.29E-07	9.65E-08	6.43E-08	3.22E-08	No
Metals	Lead	Edge of ZID	4.80E+00	1.09E+02	4.40E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	5.57E-04	4.46E-05	0	4.5E-05	4.7	5.38E-09	4.03E-09	2.69E-09	1.34E-09	No
Metals	Mercury	Edge of ZID	1.14E-01	1.09E+02	1.05E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	25036	2.52	12.6	6.60E-02	5.28E-03	0	5.3E-03	1.41	2.12E-06	1.59E-06	1.06E-06	5.31E-07	No
Metals	Molybdenum	Edge of ZID	4.87E+01	1.09E+02	4.47E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	5.65E-03	4.52E-04	0	4.5E-04	0.52	4.93E-07	3.70E-07	2.46E-07	1.23E-07	No
Metals	Nickel	Edge of ZID	6.70E+00	1.09E+02	6.15E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	188	1	1	1.16E-02	9.24E-04	0	9.2E-04	1.7	3.08E-07	2.31E-07	1.54E-07	7.71E-08	No
Metals	Selenium	Edge of ZID	1.20E+00	1.09E+02	1.10E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	19.52	1	1	2.15E-04	1.72E-05	0	1.7E-05	0.143	6.82E-08	5.11E-08	3.41E-08	1.70E-08	No
Metals	Silver	Edge of ZID	4.90E-01	1.09E+02	4.50E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	2	1	1	8.99E-06	7.19E-07	0	7.2E-07	6.02	6.77E-11	5.08E-11	3.39E-11	1.69E-11	No
Metals	Thallium	Edge of ZID	5.20E-02	1.09E+02	4.77E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	464	1	1	2.21E-04	1.77E-05	0	1.8E-05	0.096	1.05E-07	7.84E-08	5.23E-08	2.61E-08	No
Metals	Zinc	Edge of ZID	1.65E+02	1.09E+02	1.51E+00	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	188	1	1	2.85E-01	2.28E-02	0	2.3E-02	75.4	1.71E-07	1.28E-07	8.56E-08	4.28E-08	No
Cyanide	Cyanide, Total	Edge of ZID	9.00E+00	1.09E+02	8.26E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.04E-03	8.35E-05	0	8.4E-05	0.38	1.25E-07	9.35E-08	6.23E-08	3.12E-08	No
ACE inhibitor	Enalapril	Edge of ZID	1.21E-02	1.09E+02	1.11E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.40E-06	1.12E-07	0	1.1E-07	8	7.96E-12	5.97E-12	3.98E-12	1.99E-12	No
Ammonia	Total Ammonia	Edge of ZID	3.30E+04	1.09E+02	3.03E+02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	3.83E+00	3.06E-01	0	3.1E-01	--	--	--	--	--	Uncertainty
Anabolic agent	Androstenedione	Edge of ZID	1.62E-01	1.09E+02	1.49E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	121.2	1.028	1.007	1.85E-04	1.48E-05	0	1.5E-05	12	7.00E-10	5.25E-10	3.50E-10	1.75E-10	No
Analgesic	Ibuprofen	Edge of ZID	2.09E+01	1.09E+02	1.92E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1.253	1.072	3.04E-03	2.43E-04	0	2.4E-04	1.98	6.96E-08	5.22E-08	3.48E-08	1.74E-08	No
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	Edge of ZID	3.87E+01	1.09E+02	3.55E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1.01	1.002	4.54E-03	3.63E-04	0	3.6E-04	5.02	4.10E-08	3.07E-08	2.05E-08	1.02E-08	No
Anti-acid reflux	Ranitidine	Edge of ZID	8.44E-02	1.09E+02	7.74E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	9.79E-06	7.83E-07	0	7.8E-07	--	--	--	--	--	Uncertainty
Antiasthmatic	Albuterol	Edge of ZID	2.01E-02	1.09E+02	1.84E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	2.33E-06	1.87E-07	0	1.9E-07	8	1.32E-11	9.92E-12	6.61E-12	3.31E-12	No
Antiasthmatic	Theophylline	Edge of ZID	5.11E+01	1.09E+02	4.69E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	5.93E-03	4.74E-04	0	4.7E-04	0.9	2.99E-07	2.24E-07	1.49E-07	7.47E-08	No
Antibacterial	Penicillin V	Edge of ZID	1.34E-02	1.09E+02	1.23E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1.005	1	1.56E-06	1.25E-07	0	1.3E-07	14	5.06E-12	3.80E-12	2.53E-12	1.27E-12	No
Antibiotic	4-Epitetracycline [ETC]	Edge of ZID	6.62E-02	1.09E+02	6.07E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	7.68E-06	6.15E-07	0	6.1E-07	6.4	5.44E-11	4.08E-11	2.72E-11	1.36E-11	No
Antibiotic	Enrofloxacin	Edge of ZID	7.08E-04	1.09E+02	6.50E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	8.22E-08	6.57E-09	0	6.6E-09	2	1.86E-12	1.40E-12	9.32E-13	4.66E-13	No
Anticonvulsant	Benztropine	Edge of ZID	1.05E-03	1.09E+02	9.63E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1245.2	1.491	1.178	1.79E-05	1.43E-06	0	1.4E-06	0.1	8.11E-09	6.08E-09	4.06E-09	2.03E-09	No
Anticonvulsant	Carbamazepine	Edge of ZID	5.06E-01	1.09E+02	4.64E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	76.84	1.01	1.002	3.60E-04	2.88E-05	0	2.9E-05	2.116	7.72E-09	5.79E-09	3.86E-09	1.93E-09	No
Antidepressant	10-hydroxy-amitriptyline	Edge of ZID	1.92E-02	1.09E+02	1.76E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	330.56	1.067	1.014	6.21E-05	4.97E-06	0	5.0E-06	--	--	--	--	--	Uncertainty
Antidepressant	Amitriptyline	Edge of ZID	7.46E-02	1.09E+02	6.84E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	3275.6	2.78	2.193	6.23E-03	4.99E-04	0	5.0E-04	0.28	1.01E-06	7.57E-07	5.05E-07	2.52E-07	No
Antidiabetic drug	Glipizide	Edge of ZID	1.07E-02	1.09E+02	9.82E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	33.828	1	1	3.32E-06	2.66E-07	0	2.7E-07	--	--	--	--	--	Uncertainty
Antidiabetic drug	Glyburide	Edge of ZID	1.85E-02	1.09E+02	1.70E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	2689.2	2.452	1.871	1.12E-03	8.95E-05	0	9.0E-05	13	3.91E-09	2.93E-09	1.95E-09	9.76E-10	No
Antidiabetic drug	Metformin	Edge of ZID	8.93E+01	1.09E+02	8.19E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.04E-02	8.29E-04	0	8.3E-04	0.92	5.11E-07	3.83E-07	2.55E-07	1.28E-07	No
Antifungal agent	Miconazole	Edge of ZID	5.62E-02	1.09E+02	5.16E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	24768	12.691	21.677	1.62E-01	1.30E-02	0	1.3E-02	2.076	3.54E-06	2.66E-06	1.77E-06	8.85E-07	No
Antihistamine	Diphenhydramine	Edge of ZID	1.68E+00	1.09E+02	1.54E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	267.04	1.053	1.012	4.33E-03	3.47E-04	0	3.5E-04	2	9.83E-08	7.37E-08	4.92E-08	2.46E-08	No
Antihistamine	Promethazine	Edge of ZID	3.35E-02	1.09E+02	3.07E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	2771.2	2.452	1.871	2.09E-03	1.67E-04	0	1.7E-04	0.22	4.31E-07	3.23E-07	2.15E-07	1.08E-07	No
Antihypertensive	Diltiazem	Edge of ZID	4.06E-01	1.09E+02	3.72E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	112.32	1.01	1.002	4.23E-04	3.38E-05	0	3.4E-05	2.96	6.48E-09	4.86E-09	3.24E-09	1.62E-09	No
Antihypertensive	Valsartan	Edge of ZID	1.58E+01	1.09E+02	1.45E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	400	1.128	1.033	6.54E-02	5.23E-03	0	5.2E-03	--	--	--	--	--	Uncertainty
Antihypertensive	Verapamil	Edge of ZID	5.12E-02	1.09E+02	4.70E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	588.4	1.161	1.042	3.21E-04	2.57E-05	0	2.6E-05	0.456	3.19E-08	2.39E-08	1.60E-08	7.98E-09	No
Antilipemic	Gemfibrozil	Edge of ZID	1.33E+00	1.09E+02	1.22E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	2.452	1.871	3.78E-04	3.03E-05	0	3.0E-05	12.648	1.36E-09	1.02E-09	6.79E-10	3.39E-10	No
Antimicrobial, disinfectant	Triclocarban	Edge of ZID	4.89E-03	1.09E+02	4.49E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	3186	2.78	2.193	3.97E-04	3.18E-05	0	3.2E-05	138.4	1.30E-10	9.77E-11	6.51E-11	3.26E-11	No
Antimicrobial, disinfectant	Triclosan	Edge of ZID	4.31E+00	1.09E+02	3.95E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	2568.8	2.452	1.871	2.49E-01	1.99E-02	0	2.0E-02	6	1.88E-06	1.41E-06	9.41E-07	4.71E-07	No
Antipyretic, analgesic	Acetaminophen	Edge of ZID	1.22E+02	1.09E+02	1.12E+00	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.42E-02	1.13E-03	0	1.1E-03	66.66	9.63E-09	7.23E-09	4.82E-09	2.41E-09	No
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	Edge of ZID	5.78E+01	1.09E+02	5.30E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	6.71E-03	5.37E-04	0	5.4E-04	--	--	--	--	--	Uncertainty
Betablocker	Atenolol	Edge of ZID	1.88E+00	1.09E+02	1.72E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	2.18E-04	1.75E-05	0	1.7E-05	8	1.24E-09	9.28E-10	6.18E-10	3.09E-10	No
Betablocker	Metoprolol	Edge of ZID	4.89E-01	1.09E+02	4.49E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	17.944	1	1	8.05E-05	6.44E-06	0	6.4E-06	4.632	7.88E-10	5.91E-10	3.94E-10	1.97E-10	No
Betablocker	Propranolol	Edge of ZID	7.48E-02	1.09E+02	6.86E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	203.96	1.083	1.019	1.52E-04	1.21E-05	0	1.2E-05	1.28	5.37E-09	4.03E-09	2.69E-09	1.34E-09	No
BloodThinner	Warfarin	Edge of ZID	4.03E-03	1.09E+02	3.70E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	112.32	1.01	1.002	4.19E-06	3.36E-07	0	3.4E-07	0.0064	2.97E-08	2.23E-08	1.49E-08	7.43E-09	No
ChannelBlocker	Amlodipine	Edge of ZID	2.48E-02	1.09E+02	2.28E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	177.2	1.028	1.007	4.14E-05	3.32E-06	0	3.3E-06	2	9.40E-10	7.05E-10	4.70E-10	2.35E-10	No
ChannelBlocker	Dehydronifedipine	Edge of ZID	1.40E-03	1.09E+02	1.28E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	222.96	1.042	1.009	2.98E-06	2.39E-07	0	2.4E-07	--	--	--	--	--	Uncertainty
ChannelBlocker	Desmethyldiltiazem	Edge of ZID	8.36E-02	1.09E+02	7.67E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	112.32	1.01	1.002	8.70E-05	6.96E-06	0	7.0E-06	--	--	--	--	--	Uncertainty
ChannelBlocker	Norverapamil	Edge of ZID	1.89E-02	1.09E+02	1.73E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1970.4	1.95	1.459	6.66E-04	5.33E-05	0	5.3E-05	0.032	9.44E-07	7.08E-07	4.72E-07	2.36E-07	No
Cocaine metabolite	Benzoylecgonine	Edge of ZID	1.96E+00	1.09E+02	1.80E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	2.27E-04	1.82E-05	0	1.8E-05	0.3804	2.71E-08	2.03E-08	1.36E-08	6.78E-09	No
Contraceptive	Norgestrel	Edge of ZID	8.18E-02	1.09E+02	7.50E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	367.32	1.083	1.019	2.99E-04	2.39E-05	0	2.4E-05	20.04	6.76E-10	5.07E-10	3.38E-10	1.69E-10	No
Corticosteroid	Hydrocortisone	Edge of ZID	7.82E-01	1.09E+02	7.17E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	21.444	1	1	1.54E-04	1.23E-05	0	1.2E-05	0.6	1.16E-08	8.72E-09	5.82E-09	2.91E-09	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4										
Depressant	Alprazolam	Edge of ZID	3.23E-03	1.09E+02	2.96E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	46.56	1.005	1	1.39E-06	1.11E-07	0	1.1E-07	2.16	2.91E-11	2.18E-11	1.46E-11	7.28E-12	No
Depressant	Diazepam	Edge of ZID	8.27E-04	1.09E+02	7.59E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	134.8	1.028	1.007	1.05E-06	8.41E-08	0	8.4E-08	1.112	4.29E-11	3.22E-11	2.14E-11	1.07E-11	No
Diuretic	Furosemide	Edge of ZID	2.08E-01	1.09E+02	1.91E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1.005	1	2.43E-05	1.94E-06	0	1.9E-06	10.4	1.06E-10	7.94E-11	5.29E-11	2.65E-11	No
Diuretic	Hydrochlorothiazide	Edge of ZID	1.07E+00	1.09E+02	9.82E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.24E-04	9.93E-06	0	9.9E-06	12.32	4.57E-10	3.43E-10	2.29E-10	1.14E-10	No
Diuretic	Triamterene	Edge of ZID	9.41E-02	1.09E+02	8.63E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.09E-05	8.74E-07	0	8.7E-07	1.6	3.10E-10	2.32E-10	1.55E-10	7.74E-11	No
Fungicide and parasiticide	Thiabendazole	Edge of ZID	3.06E-02	1.09E+02	2.81E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	79.2	1.01	1.002	2.25E-05	1.80E-06	0	1.8E-06	5.2	1.96E-10	1.47E-10	9.80E-11	4.90E-11	No
Glycoside	Digoxin	Edge of ZID	7.01E-02	1.09E+02	6.43E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.6	1	1	8.10E-06	6.48E-07	0	6.5E-07	0.07112	5.17E-09	3.88E-09	2.58E-09	1.29E-09	No
Lincosamide antibiotic	Lincomycin	Edge of ZID	4.35E-02	1.09E+02	3.99E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	5.05E-06	4.04E-07	0	4.0E-07	3.132	7.31E-11	5.48E-11	3.66E-11	1.83E-11	No
Macrolide antibiotic	Azithromycin	Edge of ZID	3.41E-01	1.09E+02	3.13E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	834.4	1.253	1.072	3.27E-03	2.62E-04	0	2.6E-04	12	1.24E-08	9.27E-09	6.18E-09	3.09E-09	No
Macrolide antibiotic	Clarithromycin	Edge of ZID	1.65E-01	1.09E+02	1.51E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	225.96	1.042	1.009	3.56E-04	2.85E-05	0	2.9E-05	5.08	3.18E-09	2.39E-09	1.59E-09	7.96E-10	No
Macrolide antibiotic	Erythromycin-H2O	Edge of ZID	1.68E-01	1.09E+02	1.54E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	194.12	1.034	1.007	3.09E-04	2.47E-05	0	2.5E-05	10.32	1.36E-09	1.02E-09	6.80E-10	3.40E-10	No
Macrolide antibiotic	Roxithromycin	Edge of ZID	9.41E-04	1.09E+02	8.63E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	121.36	1.028	1.007	1.08E-06	8.62E-08	0	8.6E-08	0.8	6.11E-11	4.58E-11	3.05E-11	1.53E-11	No
Macrolide antibiotic	Tylosin	Edge of ZID	1.43E-03	1.09E+02	1.31E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	22.108	1	1	2.90E-07	2.32E-08	0	2.3E-08	3.2	4.11E-12	3.08E-12	2.06E-12	1.03E-12	No
Nicotinemetabolite	Cotinine	Edge of ZID	2.80E+00	1.09E+02	2.57E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	3.25E-04	2.60E-05	0	2.6E-05	6.416	2.30E-09	1.72E-09	1.15E-09	5.74E-10	No
Non-steroidalanti-inflammatory dr	Naproxen	Edge of ZID	1.24E+01	1.09E+02	1.14E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1.042	1.009	1.50E-03	1.20E-04	0	1.2E-04	4.936	1.38E-08	1.03E-08	6.89E-09	3.44E-09	No
Oil & Grease	Oil and Grease, Total (HEM)	Edge of ZID	4.27E+04	1.09E+02	3.92E+02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	0	0	0	0.00E+00	0.00E+00	0	0.0E+00	--	--	--	--	--	Uncertainty
Opiate	Codeine	Edge of ZID	1.52E-01	1.09E+02	1.39E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	11.328	1	1	1.58E-05	1.26E-06	0	1.3E-06	1.708	4.20E-10	3.15E-10	2.10E-10	1.05E-10	No
Opiate	Hydrocodone	Edge of ZID	6.87E-02	1.09E+02	6.30E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	49.8	1.005	1	3.15E-05	2.52E-06	0	2.5E-06	1.5	9.54E-10	7.15E-10	4.77E-10	2.38E-10	No
Opiate	Oxycodone	Edge of ZID	1.60E-01	1.09E+02	1.47E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.86E-05	1.49E-06	0	1.5E-06	1.28	6.58E-10	4.93E-10	3.29E-10	1.64E-10	No
Opiod	Propoxyphene	Edge of ZID	1.02E-02	1.09E+02	9.36E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1064.4	1.38	1.13	1.37E-04	1.10E-05	0	1.1E-05	0.54	1.15E-08	8.66E-09	5.77E-09	2.89E-09	No
PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-2	Edge of ZID	2.58E-02	1.09E+02	2.37E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	166.84	1.493	0.226	5.90E-05	4.72E-06	0	4.7E-06	2.22	1.20E-09	9.04E-10	6.02E-10	3.01E-10	No
PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	Edge of ZID	5.24E-03	1.09E+02	4.81E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	60560	14.355	26.669	4.18E-02	3.34E-03	0	3.3E-03	0.5	3.79E-06	2.84E-06	1.90E-06	9.48E-07	No
PBDEs	2,2',3,4,4',5,5',6-OcBDE	Edge of ZID	1.41E-03	1.09E+02	1.29E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	7728	2.732	0.778	2.73E-04	2.18E-05	0	2.2E-05	0.07	1.77E-07	1.33E-07	8.85E-08	4.42E-08	No
PBDEs	2,2',3,4,4',5',6-HpBDE	Edge of ZID	6.87E-04	1.09E+02	6.30E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	3393.2	1.493	0.226	3.19E-05	2.55E-06	0	2.6E-06	0.07	2.07E-08	1.55E-08	1.03E-08	5.17E-09	No
PBDEs	2,2',3,4,4',5'-HxBDE	Edge of ZID	4.94E-04	1.09E+02	4.53E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	9264	3.296	1.146	1.38E-04	1.11E-05	0	1.1E-05	0.07	8.97E-08	6.73E-08	4.48E-08	2.24E-08	No
PBDEs	2,2',3,4,4',6'-HxBDE	Edge of ZID	1.54E-04	1.09E+02	1.41E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	9264	3.296	1.146	4.31E-05	3.45E-06	0	3.5E-06	0.07	2.80E-08	2.10E-08	1.40E-08	6.99E-09	No
PBDEs	2,2',3,4,4'-PeBDE	Edge of ZID	1.82E-03	1.09E+02	1.67E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	25280	10.914	14.388	4.61E-03	3.69E-04	0	3.7E-04	0.07	2.99E-06	2.24E-06	1.49E-06	7.46E-07	No
PBDEs	2,2',4,4',5,5'-HxBDE	Edge of ZID	3.60E-03	1.09E+02	3.30E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	9264	3.296	1.146	1.01E-03	8.07E-05	0	8.1E-05	0.07	6.54E-07	4.90E-07	3.27E-07	1.63E-07	No
PBDEs	2,2',4,4',5,6'-HxBDE	Edge of ZID	3.05E-03	1.09E+02	2.80E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	9264	3.296	1.146	8.54E-04	6.84E-05	0	6.8E-05	0.07	5.54E-07	4.15E-07	2.77E-07	1.38E-07	No
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	Edge of ZID	4.06E-02	1.09E+02	3.72E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	60560	14.355	26.669	3.24E-01	2.59E-02	0	2.6E-02	0.058	2.53E-04	1.90E-04	1.27E-04	6.33E-05	No
PBDEs	2,2',4,4',6,6'-HxBDE	Edge of ZID	2.13E-04	1.09E+02	1.95E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	9264	3.296	1.146	5.97E-05	4.77E-06	0	4.8E-06	0.07	3.87E-08	2.90E-08	1.93E-08	9.67E-09	No
PBDEs	2,2',4,4',6-PeBDE	Edge of ZID	8.11E-03	1.09E+02	7.44E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	25280	10.914	14.388	2.05E-02	1.64E-03	0	1.6E-03	0.07	1.33E-05	9.98E-06	6.65E-06	3.33E-06	No
PBDEs	2,2',4,4'-TeBDE (BDE-47)	Edge of ZID	4.32E-02	1.09E+02	3.96E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	54400	14.355	26.669	3.09E-01	2.48E-02	0	2.5E-02	0.07	2.01E-04	1.50E-04	1.00E-04	5.01E-05	No
PBDEs	2,2',4,5'-TeBDE	Edge of ZID	1.56E-03	1.09E+02	1.43E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	54400	14.355	26.669	1.12E-02	8.94E-04	0	8.9E-04	0.07	7.24E-06	5.43E-06	3.62E-06	1.81E-06	No
PBDEs	2,2',4,6'-TeBDE	Edge of ZID	2.40E-04	1.09E+02	2.20E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	54400	14.355	26.669	1.72E-03	1.38E-04	0	1.4E-04	0.07	1.11E-06	8.36E-07	5.57E-07	2.79E-07	No
PBDEs	2,2',4-TriBDE	Edge of ZID	1.11E-03	1.09E+02	1.02E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	14076	9.716	13.964	1.39E-03	1.11E-04	0	1.1E-04	0.07	9.03E-07	6.77E-07	4.51E-07	2.26E-07	No
PBDEs	2,3',4,4',6-PeBDE	Edge of ZID	2.02E-04	1.09E+02	1.85E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	25280	10.914	14.388	5.11E-04	4.09E-05	0	4.1E-05	0.07	3.31E-07	2.49E-07	1.66E-07	8.28E-08	No
PBDEs	2,3',4,4'-TeBDE	Edge of ZID	1.50E-03	1.09E+02	1.38E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	54400	14.355	26.669	1.07E-02	8.60E-04	0	8.6E-04	0.07	6.96E-06	5.22E-06	3.48E-06	1.74E-06	No
PBDEs	2,3',4,6-TeBDE	Edge of ZID	5.58E-04	1.09E+02	5.12E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	54400	14.355	26.669	4.00E-03	3.20E-04	0	3.2E-04	0.07	2.59E-06	1.94E-06	1.30E-06	6.48E-07	No
PBDEs	2,4,4'-TriBDE	Edge of ZID	1.35E-03	1.09E+02	1.24E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	14076	9.716	13.964	1.69E-03	1.36E-04	0	1.4E-04	0.07	1.10E-06	8.23E-07	5.49E-07	2.74E-07	No
Pesticides	2,4'-DDD	Edge of ZID	1.07E-03	1.09E+02	9.82E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	13944	9.716	13.964	1.33E-03	1.06E-04	0	1.1E-04	0.147	4.10E-07	3.08E-07	2.05E-07	1.03E-07	No
Pesticides	4,4'-DDD	Edge of ZID	2.10E-02	1.09E+02	1.93E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	17420	10.556	15.996	3.54E-02	2.83E-03	0	2.8E-03	0.147	1.09E-05	8.20E-06	5.47E-06	2.73E-06	No
Pesticides	4,4'-DDE	Edge of ZID	4.70E-03	1.09E+02	4.31E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	36672	13.662	24.604	2.16E-02	1.73E-03	0	1.7E-03	0.147	6.67E-06	5.00E-06	3.33E-06	1.67E-06	No
Pesticides	4,4'-DDT	Edge of ZID	1.86E-04	1.09E+02	1.71E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	67360	14.388	26.669	1.65E-03	1.32E-04	0	1.3E-04	0.147	5.10E-07	3.83E-07	2.55E-07	1.28E-07	No
Pesticides	Aldrin	Edge of ZID	9.70E-03	1.09E+02	8.90E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	36120	13.662	24.604	4.39E-02	3.51E-03	0	3.5E-03	0.2	9.96E-06	7.47E-06	4.98E-06	2.49E-06	No
Pesticides	Chlordane, alpha (cis)	Edge of ZID	1.42E-04	1.09E+02	1.30E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	23604	12.064	19.907	3.71E-04	2.97E-05	0	3.0E-05	0.15	1.12E-07	8.41E-08	5.61E-08	2.80E-08	No
Pesticides	Chlorpyriphos	Edge of ZID	9.72E-04	1.09E+02	8.92E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	3480.8	3.181	2.612	9.87E-05	7.90E-06	0	7.9E-06	0.1	4.48E-08	3.36E-08	2.24E-08	1.12E-08	No
Pesticides	Chlorpyriphos-Methyl	Edge of ZID	2.11E-04	1.09E+02	1.94E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1296.4	1.491	1.178	3.74E-06	2.99E-07	0	3.0E-07	0.1	1.70E-09	1.27E-09	8.49E-10	4.24E-10	No
Pesticides	Cypermethrin	Edge of ZID	4.05E-03	1.09E+02	3.72E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	3881.2	14.388	26.669	2.07E-03	1.66E-04	0	1.7E-04	0.2	4.71E-07	3.53E-07	2.35E-07	1.18E-07	No
Pesticides	DEET	Edge of ZID	6.36E+00	1.09E+02	5.83E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	51	1.005	1	2.99E-03	2.39E-04	0	2.4E-04	1	1.36E-07	1.02E-07	6.78E-08	3.39E-08	No
Pesticides	Demeton-O,S	Edge of ZID	3.80E-02	1.09E+02	3.49E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	38.352	1	1	1.34E-05	1.07E-06	0	1.1E-06	0.008	7.58E-08	5.69E-08	3.79E-08	1.90E-08	No
Pesticides	Dieldrin	Edge of ZID	1.40E-02	1.09E+02	1.28E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	5012	4.188	3.873	2.70E-03	2.16E-04	0	2.2E-04	0.015	8.15E-06	6.11E-06	4.08E-06	2.04E-06	No
Pesticides	Endosulfan Sulfate	Edge of ZID	2.20E-02	1.09E+02	2.02E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	482.8	1.128	1.033	1.10E-04	8.79E-06	0	8.8E-06	0.058	8.60E-08	6.45E-08	4.30E-08	2.15E-08	No
Pesticides	Endrin	Edge of ZID	6.20E-05	1.09E+02	5.69E-07	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	5012	4.188	3.873	1.19E-05	9.55E-07	0	9.6E-07	0.184	2.94E-09	2.21E-09	1.47E-09	7.36E-10	No
Pesticides	Endrin Ketone	Edge of ZID	9.60E-03	1.09E+02	8.81E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	3623.2	3.181	2.612	1.02E-03	8.12E-05	0	8.1E-05	0.184	2.50E-07	1.88E-07	1.25E-07	6.26E-08	No
Pesticides	HCH, alpha	Edge of ZID	6.60E-05	1.09E+02	6.06E-07	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1001.6	1.315	1.096	7.98E-07	6.38E-08	0	6.4E-08	87	4.16E-13	3.12E-13	2.08E-13	1.04E-13	No
Pesticides	HCH, beta	Edge of ZID	1.09E-04	1.09E+02	1.00E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1001.6	1.315	1.096	1.32E-06	1.05E-07	0	1.1E-07	0.4	1.49E-10	1.12E-10	7.47E-11	3.73E-11	No
Pesticides	HCH, gamma	Edge of ZID	6.96E-04	1.09E+02	6.39E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1001.6	1.315	1.096	8.41E-06	6.73E-07	0	6.7E-07	0.014	2.73E-08	2.04E-08	1.36E-08	6.81E-09	No
Pesticides	Heptachlor	Edge of ZID	1.40E-02	1.09E+02	1.28E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	7552	6.266	7.079	6.08E-03	4.86E-04	0	4.9E-04	0.2	1.38E-06	1.03E-06	6.89E-07	3.45E-07	No
Pesticides	Hexachlorobenzene	Edge of ZID	5.17E-04	1.09E+02	4.74E-06	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	11212	7.962	10.209	4.23E-04	3.39E-05	0	3.4E-05	7.1	2.71E-09	2.03E-09	1.35E-09	6.76E-10	No
Pesticides	Malathion	Edge of ZID	5.20E-01	1.09E+02	4.77E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	67	1.01	1.002	3.23E-04	2.58E-05	0	2.6E-05	0.046	3.18E-07	2.39E-07	1.59E-07	7.96E-08	No
Pesticides	Methoxychlor	Edge of ZID	2.90E-03	1.09E+02	2.66E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	4176	3.643	3.162	4.05E-04	3.24E-05	0	3.2E-05	1.002	1.83E-08	1.37E-08	9.16E-09	4.58E-09	No
Pesticides	Permethrin	Edge of ZID	4.23E-02	1.09E+02	3.88E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1989.2	13.662	24.604	1.05E-02	8.44E-04	0	8.4E-04	5	9.57E-08	7.18E-08	4.78E-08	2.39E-08	No
PFAS	5:3 FTCA	Edge of ZID	5.92E-02	1.09E+02	5.43E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1.766	1.334	1.21E-05	9.71E-07	0	9.7E-07	5	1.10E-10	8.25E-11	5.50E-11	2.75E-11	No
PFAS	PFBA	Edge of ZID	1.49E-02	1.09E+02	1.37E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1.005	1	1.74E-06	1.39E-07	0	1.4E-07	35	2.25E-12	1.69E-12	1.13E-12	5.63E-13	No
PFAS	PFHpA	Edge of ZID	8.47E-03	1.09E+02	7.77E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1.315	1.096	1.29E-06	1.03E-07	0	1.0E-07	--	--	--	--	--	Uncertainty
PFAS	PFHxA	Edge of ZID	2.55E-02	1.09E+02	2.34E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1.083	1.019	3.20E-06	2.56E-07	0	2.6E-07	20	7.27E-12	5.45E-12	3.63E-12	1.82E-12	No
PFAS	PFHxS	Edge of ZID	3.96E-02	1.09E+02	3.63E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1.042	1.009	4.79E-06	3.83E-07	0	3.8E-07	5.72	3.80E-11	2.85E-11	1.90E-11	9.49E-12	No
PFAS	PFNA	Edge of ZID	5.14E-03	1.09E+02	4.72E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	40	6.266	7.079	1.18E-05	9.46E-07	0	9.5E-07	0.166	3.23E-09	2.42E-09	1.61E-09	8.07E-10	No
PFAS	PFOA	Edge of ZID	1.85E-02	1.09E+02	1.70E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	2.452	1.871	5.26E-06	4.21E-07	0	4.2E-07	1.75	1.36E-10	1.02E-10	6.82E-11	3.41E-11	No
PFAS	PFOS	Edge of ZID	6.53E-02	1.09E+02	5.99E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1.766	1.334	1.34E-05	1.07E-06	0	1.1E-06	0.12	5.06E-09	3.79E-09	2.53E-09	1.26E-09	No
PFAS	PFPeA	Edge of ZID	2.03E-02	1.09E+02	1.86E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1.028	1.007	2.42E-06	1.94E-07	0	1.9E-07	--	--	--	--	--	Uncertainty
PFAS	PFPeS	Edge of ZID	3.84E-03	1.09E+02	3.52E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1.01	1.002	4.50E-07	3.60E-08	0	3.6E-08	--	--	--	--	--	Uncertainty
Plasticizer	Bisphenol A	Edge of ZID	1.59E+00	1.09E+02	1.46E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	288.12	1.053	1.012	4.43E-03	3.54E-04	0	3.5E-04	10	2.01E-08	1.51E-08	1.00E-08	5.02E-09	No
Plasticizer	Bisphenol S	Edge of ZID	8.88E-01	1.09E+02	8.15E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	22.672	1	1	1.85E-04	1.48E-05	0	1.5E-05	10	8.38E-10	6.28E-10	4.19E-10	2.09E-10	No
Pyrimidine antibiotic	Trimethoprim	Edge of ZID	7.11E-01	1.09E+02	6.52E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	8.25E-05	6.60E-06	0	6.6E-06	0.8	4.68E-09	3.51E-09	2.34E-09	1.17E-09	No
Quinoline antibiotic	Ciprofloxacin	Edge of ZID	3.72E-01	1.09E+02	3.41E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	4.32E-05	3.45E-06	0	3.5E-06	4	4.90E-10	3.67E-10	2.45E-10	1.22E-10	No
Quinoline antibiotic	Ofloxacin	Edge of ZID	4.27E-01	1.09E+02	3.92E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	4.95E-05	3.96E-06	0	4.0E-06	2	1.12E-09	8.43E-10	5.62E-10	2.81E-10	No
Rubber Stabilizing compound	6PPD-Quinone	Edge of ZID	5.30E-03	1.09E+02	4.86E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	781.6	1.253	1.072	4.76E-05	3.81E-06	0	3.8E-06	2	1.08E-09	8.10E-10	5.40E-10	2.70E-10	No
Sex hormone	17 beta-Estradiol	Edge of ZID	5.52E-03	1.09E+02	5.06E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	822	1.253	1.072	5.22E-05	4.17E-06	0	4.2E-06	0.01	2.37E-07	1.77E-07	1.18E-07	5.92E-08	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4										
Sex hormone	Estrone	Edge of ZID	3.31E-02	1.09E+02	3.04E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	215.88	1.034	1.007	6.78E-05	5.42E-06	0	5.4E-06	--	--	--	--	--	Uncertainty
Sex hormone	Progesterone	Edge of ZID	5.66E-02	1.09E+02	5.19E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	664.4	1.202	1.054	4.15E-04	3.32E-05	0	3.3E-05	0.66	2.85E-08	2.14E-08	1.43E-08	7.13E-09	No
Sex hormone	Testosterone	Edge of ZID	7.17E-02	1.09E+02	6.58E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	288.12	1.053	1.012	2.00E-04	1.60E-05	0	1.6E-05	1.72	5.26E-09	3.95E-09	2.63E-09	1.32E-09	No
SSRI Antidepressant	Fluoxetine	Edge of ZID	5.20E-02	1.09E+02	4.77E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	616	1.161	1.042	3.41E-04	2.73E-05	0	2.7E-05	1.136	1.36E-08	1.02E-08	6.81E-09	3.41E-09	No
SSRI Antidepressant	Norfluoxetine	Edge of ZID	2.73E-02	1.09E+02	2.50E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1068	1.38	1.13	3.69E-04	2.95E-05	0	3.0E-05	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Paroxetine	Edge of ZID	1.88E-02	1.09E+02	1.72E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	754.4	1.253	1.072	1.63E-04	1.30E-05	0	1.3E-05	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Sertraline	Edge of ZID	1.08E-01	1.09E+02	9.91E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	5716	4.803	4.742	2.72E-02	2.18E-03	0	2.2E-03	--	--	--	--	--	Uncertainty
Statin	Atorvastatin	Edge of ZID	2.20E-01	1.09E+02	2.02E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	224.92	13.228	23.281	6.01E-03	4.80E-04	0	4.8E-04	20	1.36E-08	1.02E-08	6.81E-09	3.41E-09	No
Steroid	Methylprednisolone	Edge of ZID	1.13E-01	1.09E+02	1.04E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	29.396	1	1	3.05E-05	2.44E-06	0	2.4E-06	8	1.73E-10	1.30E-10	8.64E-11	4.32E-11	No
Steroid	Prednisolone	Edge of ZID	9.31E-03	1.09E+02	8.54E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	21.772	1	1	1.86E-06	1.49E-07	0	1.5E-07	6.72	1.26E-11	9.41E-12	6.28E-12	3.14E-12	No
Steroidal Estrogen	Equilenin	Edge of ZID	1.34E-02	1.09E+02	1.23E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	726.4	1.202	1.054	1.07E-04	8.59E-06	0	8.6E-06	--	--	--	--	--	Uncertainty
Stimulant	Amphetamine	Edge of ZID	5.39E-01	1.09E+02	4.94E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	26.936	1	1	1.33E-04	1.07E-05	0	1.1E-05	0.12	5.04E-08	3.78E-08	2.52E-08	1.26E-08	No
Stimulant	Caffeine	Edge of ZID	1.05E+02	1.09E+02	9.63E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.22E-02	9.75E-04	0	9.7E-04	0.508	1.09E-06	8.16E-07	5.44E-07	2.72E-07	No
Stimulant	Cocaine	Edge of ZID	7.68E-01	1.09E+02	7.05E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	61.16	1.01	1.002	4.35E-04	3.48E-05	0	3.5E-05	0.396	4.99E-08	3.74E-08	2.49E-08	1.25E-08	No
Streoid	Prednisone	Edge of ZID	4.04E-01	1.09E+02	3.71E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	17.076	1	1	6.33E-05	5.06E-06	0	5.1E-06	--	--	--	--	--	Uncertainty
Sulfonamide antibiotic	Sulfadiazine	Edge of ZID	1.46E-03	1.09E+02	1.34E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.69E-07	1.36E-08	0	1.4E-08	6	1.28E-12	9.61E-13	6.40E-13	3.20E-13	No
Sulfonamide antibiotic	Sulfamethizole	Edge of ZID	5.11E-03	1.09E+02	4.69E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	5.93E-07	4.74E-08	0	4.7E-08	14	1.92E-12	1.44E-12	9.61E-13	4.80E-13	No
Sulfonamide antibiotic	Sulfamethoxazole	Edge of ZID	1.08E+00	1.09E+02	9.91E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.25E-04	1.00E-05	0	1.0E-05	9.2	6.18E-10	4.63E-10	3.09E-10	1.54E-10	No
Sulfonamide antibiotic	Sulfanilamide	Edge of ZID	3.48E-02	1.09E+02	3.19E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	4.04E-06	3.23E-07	0	3.2E-07	12	1.53E-11	1.14E-11	7.63E-12	3.82E-12	No
SVOCs/PAHs	1,2-Diphenylhydrazine	Edge of ZID	2.50E+00	1.09E+02	2.29E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	161.76	1.028	1.007	3.81E-03	3.05E-04	0	3.1E-04	--	--	--	--	--	Uncertainty
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	Edge of ZID	1.00E-01	1.09E+02	9.17E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	2775.2	2.452	1.871	6.24E-03	4.99E-04	0	5.0E-04	65.6	4.32E-09	3.24E-09	2.16E-09	1.08E-09	No
SVOCs/PAHs	1-Methyldibenzothiophene	Edge of ZID	5.00E-02	1.09E+02	4.59E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	2390	2.175	1.633	2.38E-03	1.91E-04	0	1.9E-04	65.6	1.65E-09	1.24E-09	8.24E-10	4.12E-10	No
SVOCs/PAHs	1-Methylfluorene	Edge of ZID	5.00E-02	1.09E+02	4.59E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	3534	3.181	2.612	5.16E-03	4.13E-04	0	4.1E-04	65.6	3.57E-09	2.67E-09	1.78E-09	8.91E-10	No
SVOCs/PAHs	1-Methylnaphthalene	Edge of ZID	4.27E-01	1.09E+02	3.92E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	664.4	1.202	1.054	3.13E-03	2.50E-04	0	2.5E-04	0.94	1.51E-07	1.13E-07	7.55E-08	3.77E-08	No
SVOCs/PAHs	1-Methylphenanthrene	Edge of ZID	2.85E-02	1.09E+02	2.61E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	19132	3.643	3.162	1.82E-02	1.46E-03	0	1.5E-03	65.6	1.26E-08	9.45E-09	6.30E-09	3.15E-09	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Edge of ZID	1.20E+00	1.09E+02	1.10E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	505.6	1.128	1.033	6.28E-03	5.02E-04	0	5.0E-04	3	9.49E-08	7.12E-08	4.75E-08	2.37E-08	No
SVOCs/PAHs	2,6-Dimethylnaphthalene	Edge of ZID	3.44E-01	1.09E+02	3.16E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1296.4	1.491	1.178	6.10E-03	4.88E-04	0	4.9E-04	65.6	4.22E-09	3.16E-09	2.11E-09	1.05E-09	No
SVOCs/PAHs	2-Methylanthracene	Edge of ZID	6.36E-02	1.09E+02	5.83E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	3698.8	3.181	2.612	6.87E-03	5.49E-04	0	5.5E-04	65.6	4.75E-09	3.56E-09	2.37E-09	1.19E-09	No
SVOCs/PAHs	2-Methylfluoranthene	Edge of ZID	1.74E-02	1.09E+02	1.60E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	7672	6.266	7.079	7.67E-03	6.14E-04	0	6.1E-04	65.6	5.31E-09	3.98E-09	2.65E-09	1.33E-09	No
SVOCs/PAHs	2-Methylnaphthalene	Edge of ZID	5.41E-01	1.09E+02	4.96E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	654.4	1.202	1.054	3.90E-03	3.12E-04	0	3.1E-04	65.6	2.70E-09	2.02E-09	1.35E-09	6.75E-10	No
SVOCs/PAHs	2-Methylphenanthrene	Edge of ZID	6.47E-02	1.09E+02	5.94E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	13696	2.78	2.193	2.26E-02	1.81E-03	0	1.8E-03	65.6	1.56E-08	1.17E-08	7.81E-09	3.91E-09	No
SVOCs/PAHs	3,6-Dimethylphenanthrene	Edge of ZID	1.89E-02	1.09E+02	1.73E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	33036	5.502	5.821	3.15E-02	2.52E-03	0	2.5E-03	65.6	2.18E-08	1.63E-08	1.09E-08	5.45E-09	No
SVOCs/PAHs	3-Methylphenanthrene	Edge of ZID	5.79E-02	1.09E+02	5.31E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	13696	2.78	2.193	2.02E-02	1.62E-03	0	1.6E-03	65.6	1.40E-08	1.05E-08	6.99E-09	3.50E-09	No
SVOCs/PAHs	4-Methyldibenzothiophene	Edge of ZID	2.29E-02	1.09E+02	2.10E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	2390	2.175	1.633	1.09E-03	8.74E-05	0	8.7E-05	65.6	7.55E-10	5.66E-10	3.78E-10	1.89E-10	No
SVOCs/PAHs	Acenaphthene	Edge of ZID	8.21E-02	1.09E+02	7.53E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	716.8	1.202	1.054	6.49E-04	5.19E-05	0	5.2E-05	65.6	4.49E-10	3.37E-10	2.24E-10	1.12E-10	No
SVOCs/PAHs	Acenaphthylene	Edge of ZID	1.25E-02	1.09E+02	1.15E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	739.2	1.202	1.054	1.02E-04	8.15E-06	0	8.2E-06	65.6	7.05E-11	5.28E-11	3.52E-11	1.76E-11	No
SVOCs/PAHs	Anthracene	Edge of ZID	5.53E-02	1.09E+02	5.07E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1604	1.766	1.334	1.44E-03	1.15E-04	0	1.1E-04	65.6	9.94E-10	7.45E-10	4.97E-10	2.48E-10	No
SVOCs/PAHs	Benz(a)anthracene	Edge of ZID	2.50E-01	1.09E+02	2.29E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	11736	8.841	12.05	2.38E-01	1.90E-02	0	1.9E-02	0.62	1.74E-05	1.31E-05	8.71E-06	4.35E-06	No
SVOCs/PAHs	Benzo(a)fluoranthene	Edge of ZID	1.51E-02	1.09E+02	1.39E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12096	8.841	12.05	1.48E-02	1.19E-03	0	1.2E-03	0.615	1.09E-06	8.20E-07	5.46E-07	2.73E-07	No
SVOCs/PAHs	Benzo(a)pyrene	Edge of ZID	5.63E-02	1.09E+02	5.17E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	20588	11.337	17.783	1.21E-01	9.64E-03	0	9.6E-03	0.62	8.82E-06	6.62E-06	4.41E-06	2.21E-06	No
SVOCs/PAHs	Benzo(b)fluoranthene	Edge of ZID	4.90E-02	1.09E+02	4.50E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12096	8.841	12.05	4.81E-02	3.85E-03	0	3.8E-03	0.62	3.52E-06	2.64E-06	1.76E-06	8.79E-07	No
SVOCs/PAHs	Benzo(b)fluorene	Edge of ZID	4.06E-02	1.09E+02	3.72E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	11916	8.841	12.05	3.92E-02	3.14E-03	0	3.1E-03	0.615	2.89E-06	2.17E-06	1.45E-06	7.24E-07	No
SVOCs/PAHs	Benzo(e)pyrene	Edge of ZID	5.23E-02	1.09E+02	4.80E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	32976	13.228	23.281	2.09E-01	1.67E-02	0	1.7E-02	0.615	1.54E-05	1.16E-05	7.72E-06	3.86E-06	No
SVOCs/PAHs	Benzo(g,h,i)perylene	Edge of ZID	8.33E-02	1.09E+02	7.64E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	44000	13.98	25.645	4.70E-01	3.76E-02	0	3.8E-02	14.4	1.48E-06	1.11E-06	7.40E-07	3.70E-07	No
SVOCs/PAHs	Benzo(k,j)fluoranthene	Edge of ZID	3.34E-02	1.09E+02	3.06E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	19972	11.337	17.783	6.94E-02	5.55E-03	0	5.6E-03	0.615	5.12E-06	3.84E-06	2.56E-06	1.28E-06	No
SVOCs/PAHs	Benzothiophene	Edge of ZID	1.44E-02	1.09E+02	1.32E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	212.64	1.034	1.007	2.90E-05	2.32E-06	0	2.3E-06	0.615	2.14E-09	1.61E-09	1.07E-09	5.36E-10	No
SVOCs/PAHs	Biphenyl	Edge of ZID	1.02E-01	1.09E+02	9.36E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	822	1.253	1.072	9.64E-04	7.71E-05	0	7.7E-05	0.615	7.11E-08	5.33E-08	3.55E-08	1.78E-08	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Edge of ZID	9.50E+01	1.09E+02	8.72E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	6848	11.708	16.749	6.99E+01	5.59E+00	0	5.6E+00	18.3	1.73E-04	1.30E-04	8.66E-05	4.33E-05	No
SVOCs/PAHs	Butyl Benzyl Phthalate	Edge of ZID	5.62E+00	1.09E+02	5.16E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	2454.4	2.175	1.633	2.75E-01	2.20E-02	0	2.2E-02	159	7.85E-08	5.89E-08	3.93E-08	1.96E-08	No
SVOCs/PAHs	Carbazole	Edge of ZID	2.01E-01	1.09E+02	1.84E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	529.2	1.128	1.033	1.10E-03	8.81E-05	0	8.8E-05	0.615	8.12E-08	6.09E-08	4.06E-08	2.03E-08	No
SVOCs/PAHs	Chrysene/Triphenylene	Edge of ZID	6.14E-02	1.09E+02	5.63E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12660	8.841	12.05	6.30E-02	5.04E-03	0	5.0E-03	0.615	4.65E-06	3.49E-06	2.33E-06	1.16E-06	No
SVOCs/PAHs	cis/trans Decalin	Edge of ZID	4.84E-01	1.09E+02	4.44E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1091.2	1.38	1.13	6.69E-03	5.35E-04	0	5.3E-04	16.68	1.82E-08	1.36E-08	9.09E-09	4.55E-09	No
SVOCs/PAHs	Dibenzo(a,h)anthracene	Edge of ZID	6.68E-03	1.09E+02	6.13E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	38384	13.662	24.604	3.21E-02	2.57E-03	0	2.6E-03	2.66	5.48E-07	4.11E-07	2.74E-07	1.37E-07	No
SVOCs/PAHs	Dibenzofuran	Edge of ZID	6.98E-02	1.09E+02	6.40E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	971.6	1.315	1.096	8.18E-04	6.55E-05	0	6.5E-05	0.615	6.03E-08	4.53E-08	3.02E-08	1.51E-08	No
SVOCs/PAHs	Dibenzothiophene	Edge of ZID	3.35E-02	1.09E+02	3.07E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1442	1.614	1.242	7.15E-04	5.72E-05	0	5.7E-05	1.04	3.12E-08	2.34E-08	1.56E-08	7.80E-09	No
SVOCs/PAHs	Diethyl Phthalate	Edge of ZID	3.70E+00	1.09E+02	3.39E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	73.4	1.01	1.002	2.52E-03	2.01E-04	0	2.0E-04	4600	2.48E-11	1.86E-11	1.24E-11	6.20E-12	No
SVOCs/PAHs	Dimethyl Phthalate	Edge of ZID	1.20E-01	1.09E+02	1.10E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	21.124	1	1	2.33E-05	1.86E-06	0	1.9E-06	68	1.55E-11	1.16E-11	7.76E-12	3.88E-12	No
SVOCs/PAHs	Di-n-butyl Phthalate	Edge of ZID	8.40E-01	1.09E+02	7.71E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1730.4	1.766	1.334	2.35E-02	1.88E-03	0	1.9E-03	1340	7.97E-10	5.98E-10	3.99E-10	1.99E-10	No
SVOCs/PAHs	Di-n-octyl Phthalate	Edge of ZID	1.89E+01	1.09E+02	1.73E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	3895.6	7.278	6.012	4.92E+00	3.93E-01	0	3.9E-01	36.8	6.06E-06	4.54E-06	3.03E-06	1.51E-06	No
SVOCs/PAHs	Fluoranthene	Edge of ZID	3.17E-01	1.09E+02	2.91E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	4716	4.188	3.873	5.74E-02	4.60E-03	0	4.6E-03	125	2.08E-08	1.56E-08	1.04E-08	5.21E-09	No
SVOCs/PAHs	Fluorene	Edge of ZID	1.26E-01	1.09E+02	1.16E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	1064.4	1.38	1.13	1.70E-03	1.36E-04	0	1.4E-04	125	6.16E-10	4.62E-10	3.08E-10	1.54E-10	No
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	Edge of ZID	4.44E-02	1.09E+02	4.07E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	48720	14.223	26.363	2.82E-01	2.26E-02	0	2.3E-02	7.2	1.78E-06	1.33E-06	8.89E-07	4.45E-07	No
SVOCs/PAHs	Isophorone	Edge of ZID	3.80E-01	1.09E+02	3.49E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	24.588	1	1	8.57E-05	6.86E-06	0	6.9E-06	150	2.59E-11	1.94E-11	1.30E-11	6.48E-12	No
SVOCs/PAHs	Naphthalene	Edge of ZID	9.80E-01	1.09E+02	8.99E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	279.52	1.053	1.012	2.65E-03	2.12E-04	0	2.1E-04	71	1.69E-09	1.27E-09	8.45E-10	4.23E-10	No
SVOCs/PAHs	Naphthobenzothiophene	Edge of ZID	3.37E-02	1.09E+02	3.09E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	4936	4.188	3.873	6.39E-03	5.11E-04	0	5.1E-04	0.615	4.71E-07	3.54E-07	2.36E-07	1.18E-07	No
SVOCs/PAHs	N-Nitrosodimethylamine	Edge of ZID	9.60E+00	1.09E+02	8.81E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.11E-03	8.91E-05	0	8.9E-05	0.005	1.01E-05	7.58E-06	5.05E-06	2.53E-06	No
SVOCs/PAHs	Pentachlorophenol (PCP)	Edge of ZID	6.30E+00	1.09E+02	5.78E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	4440	3.643	3.162	9.35E-01	7.48E-02	0	7.5E-02	8.42	5.04E-06	3.78E-06	2.52E-06	1.26E-06	No
SVOCs/PAHs	Perylene	Edge of ZID	3.33E-02	1.09E+02	3.06E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	24708	12.691	21.677	9.58E-02	7.66E-03	0	7.7E-03	0.615	7.07E-06	5.30E-06	3.53E-06	1.77E-06	No
SVOCs/PAHs	Phenanthrene	Edge of ZID	9.80E-01	1.09E+02	8.99E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	7460	1.766	1.334	1.18E-01	9.48E-03	0	9.5E-03	65.6	8.19E-08	6.14E-08	4.10E-08	2.05E-08	No
SVOCs/PAHs	Phenol	Edge of ZID	5.45E+01	1.09E+02	5.00E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	17.076	1	1	8.54E-03	6.83E-04	0	6.8E-04	60	6.46E-09	4.84E-09	3.23E-09	1.61E-09	No
SVOCs/PAHs	Pyrene	Edge of ZID	4.70E-01	1.09E+02	4.31E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	3082.4	2.78	2.193	3.69E-02	2.96E-03	0	3.0E-03	0.615	2.73E-06	2.04E-06	1.36E-06	6.81E-07	No
SVOCs/PAHs	Retene	Edge of ZID	1.08E-02	1.09E+02	9.91E-05	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	131400	12.691	21.677	1.65E-01	1.32E-02	0	1.3E-02	65.6	1.14E-07	8.57E-08	5.71E-08	2.86E-08	No
Tetracycline antibiotic	Doxycycline	Edge of ZID	1.50E-01	1.09E+02	1.38E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.74E-05	1.39E-06	0	1.4E-06	4.0298	1.96E-10	1.47E-10	9.80E-11	4.90E-11	No
Tetracycline antibiotic	Tetracycline [TC]	Edge of ZID	9.79E-02	1.09E+02	8.98E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.14E-05	9.09E-07	0	9.1E-07	6.4	8.05E-11	6.04E-11	4.03E-11	2.01E-11	No
Tranquilizer	Meprobamate	Edge of ZID	3.83E-01	1.09E+02	3.51E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	4.44E-05	3.56E-06	0	3.6E-06	3	6.72E-10	5.04E-10	3.36E-10	1.68E-10	No
Urinary steroid	Androsterone	Edge of ZID	5.71E-02	1.09E+02	5.24E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	505.6	1.128	1.033	2.99E-04	2.39E-05	0	2.4E-05	200	6.78E-11	5.08E-11	3.39E-11	1.69E-11	No
VOCs	1,1,1-Trichloroethane (TCA)	Edge of ZID	7.90E-01	1.09E+02	7.25E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	81.64	1.01	1.002	5.98E-04	4.78E-05	0	4.8E-05	999	2.71E-11	2.04E-11	1.36E-11	6.78E-12	No
VOCs	1,2-Dichloroethane (EDC)	Edge of ZID	8.00E-02	1.09E+02	7.34E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	17.604	1	1	1.29E-05	1.03E-06	0	1.0E-06	382	1.53E-12	1.15E-12	7.67E-13	3.84E-13	No
VOCs	1,4-Dichlorobenzene	Edge of ZID	8.40E-01	1.09E+02	7.71E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	345.76	1.067	1.014	2.84E-03	2.27E-04	0	2.3E-04	2.5	5.16E-08	3.87E-08	2.58E-08	1.29E-08	No
VOCs	2-Butanone (MEK)	Edge of ZID	6.80E+01	1.09E+02	6.24E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	7.89E-03	6.31E-04	0	6.3E-04	1771	2.02E-10	1.52E-10	1.01E-10	5.05E-11	No

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Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
VOCs	2-Hexanone	Edge of ZID	5.70E+00	1.09E+02	5.23E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	15.12	1	1	7.91E-04	6.33E-05	0	6.3E-05	8.27	4.34E-09	3.25E-09	2.17E-09	1.08E-09	No
VOCs	Acetone	Edge of ZID	3.00E+02	1.09E+02	2.75E+00	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	3.48E-02	2.78E-03	0	2.8E-03	20	7.90E-08	5.92E-08	3.95E-08	1.97E-08	No
VOCs	Acrolein	Edge of ZID	1.30E+00	1.09E+02	1.19E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	1.51E-04	1.21E-05	0	1.2E-05	0.05	1.37E-07	1.03E-07	6.84E-08	3.42E-08	No
VOCs	Benzene	Edge of ZID	7.80E-01	1.09E+02	7.16E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	47.24	1.005	1	3.40E-04	2.72E-05	0	2.7E-05	26.36	5.85E-10	4.38E-10	2.92E-10	1.46E-10	No
VOCs	Bromodichloromethane	Edge of ZID	8.00E-02	1.09E+02	7.34E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	38.784	1.005	1	2.86E-05	2.29E-06	0	2.3E-06	3.58	3.62E-10	2.72E-10	1.81E-10	9.06E-11	No
VOCs	Bromomethane	Edge of ZID	9.00E-02	1.09E+02	8.26E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	11.328	1	1	9.35E-06	7.48E-07	0	7.5E-07	0.284	1.49E-09	1.12E-09	7.47E-10	3.73E-10	No
VOCs	Carbon Disulfide	Edge of ZID	7.00E-01	1.09E+02	6.42E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	35.404	1	1	2.27E-04	1.82E-05	0	1.8E-05	11	9.38E-10	7.03E-10	4.69E-10	2.34E-10	No
VOCs	Chlorobenzene	Edge of ZID	8.00E-02	1.09E+02	7.34E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	138.96	1.028	1.007	1.05E-04	8.39E-06	0	8.4E-06	19	2.50E-10	1.88E-10	1.25E-10	6.26E-11	No
VOCs	Chloroethane	Edge of ZID	6.90E-01	1.09E+02	6.33E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	16.316	1	1	1.03E-04	8.26E-06	0	8.3E-06	--	--	--	--	--	Uncertainty
VOCs	Chloroform	Edge of ZID	3.95E+00	1.09E+02	3.62E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	37.056	1	1	1.34E-03	1.07E-04	0	1.1E-04	2.58	2.36E-08	1.77E-08	1.18E-08	5.90E-09	No
VOCs	Chloromethane	Edge of ZID	1.90E+00	1.09E+02	1.74E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.648	1	1	2.20E-04	1.76E-05	0	1.8E-05	3.2	3.13E-09	2.34E-09	1.56E-09	7.81E-10	No
VOCs	cis-1,2-Dichloroethene	Edge of ZID	7.00E-02	1.09E+02	6.42E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	38.784	1.005	1	2.50E-05	2.00E-06	0	2.0E-06	90.4	1.26E-11	9.42E-12	6.28E-12	3.14E-12	No
VOCs	Dichloromethane (Methylene Chlori	Edge of ZID	6.85E+00	1.09E+02	6.28E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	12.412	1	1	7.80E-04	6.24E-05	0	6.2E-05	5.85	6.05E-09	4.54E-09	3.02E-09	1.51E-09	No
VOCs	Ethylbenzene	Edge of ZID	1.50E+00	1.09E+02	1.38E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	222.56	1.042	1.009	3.19E-03	2.55E-04	0	2.6E-04	97.1	1.49E-09	1.12E-09	7.45E-10	3.73E-10	No
VOCs	m,p-Xylenes	Edge of ZID	6.20E+00	1.09E+02	5.69E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	226	1.042	1.009	1.34E-02	1.07E-03	0	1.1E-03	2.1	2.89E-07	2.17E-07	1.45E-07	7.23E-08	No
VOCs	o-Xylene	Edge of ZID	2.60E+00	1.09E+02	2.39E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	225.96	1.042	1.009	5.62E-03	4.49E-04	0	4.5E-04	2.1	1.21E-07	9.10E-08	6.07E-08	3.03E-08	No
VOCs	Styrene	Edge of ZID	5.50E+00	1.09E+02	5.05E-02	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	164.24	1.028	1.007	8.52E-03	6.82E-04	0	6.8E-04	200	1.93E-09	1.45E-09	9.66E-10	4.83E-10	No
VOCs	Tetrachloroethene (PCE)	Edge of ZID	6.00E-01	1.09E+02	5.50E-03	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	325.36	1.067	1.014	1.91E-03	1.53E-04	0	1.5E-04	63	1.38E-09	1.03E-09	6.88E-10	3.44E-10	No
VOCs	Toluene	Edge of ZID	1.60E+01	1.09E+02	1.47E-01	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	117.56	1.01	1.002	1.74E-02	1.39E-03	0	1.4E-03	26	3.04E-08	2.28E-08	1.52E-08	7.60E-09	No
VOCs	Trichloroethene (TCE)	Edge of ZID	7.00E-02	1.09E+02	6.42E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	73.4	1.01	1.002	4.76E-05	3.81E-06	0	3.8E-06	2.8	7.71E-10	5.78E-10	3.86E-10	1.93E-10	No
VOCs	Vinyl Chloride	Edge of ZID	2.00E-02	1.09E+02	1.83E-04	Steller Sea Lion	263	0.08	0	0.000567	1	1	0	model	21.884	1	1	4.02E-06	3.21E-07	0	3.2E-07	0.17	1.07E-09	8.04E-10	5.36E-10	2.68E-10	No
Metals	Antimony	Knik Arm	9.04E-01	1.22E+03	7.39E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	4	1	1	2.96E-06	8.87E-08	0	8.9E-08	0.059	2.09E-08	1.57E-08	1.04E-08	5.22E-09	No
Metals	Arsenic	Knik Arm	3.42E+00	1.22E+03	2.80E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	176	1	1	4.92E-04	1.48E-05	0	1.5E-05	1.04	1.97E-07	1.48E-07	9.87E-08	4.93E-08	No
Metals	Beryllium	Knik Arm	1.80E-02	1.22E+03	1.47E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	76	1	1	1.12E-06	3.36E-08	0	3.4E-08	0.532	8.77E-10	6.58E-10	4.38E-10	2.19E-10	No
Metals	Cadmium	Knik Arm	3.09E-01	1.22E+03	2.53E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	152	1	1	3.84E-05	1.15E-06	0	1.2E-06	0.77	2.08E-08	1.56E-08	1.04E-08	5.20E-09	No
Metals	Chromium	Knik Arm	3.46E+00	1.22E+03	2.83E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	64	1	1	1.81E-04	5.43E-06	0	5.4E-06	2.4	3.15E-08	2.36E-08	1.57E-08	7.86E-09	No
Metals	Copper	Knik Arm	1.15E+02	1.22E+03	9.40E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	144	1	1	1.35E-02	4.06E-04	0	4.1E-04	5.6	1.01E-06	7.56E-07	5.04E-07	2.52E-07	No
Metals	Dissolved Antimony	Knik Arm	8.06E-01	1.22E+03	6.59E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	4	1	1	2.64E-06	7.91E-08	0	7.9E-08	0.059	1.86E-08	1.40E-08	9.32E-09	4.66E-09	No
Metals	Dissolved Arsenic	Knik Arm	2.78E+00	1.22E+03	2.27E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	176	1	1	4.00E-04	1.20E-05	0	1.2E-05	1.04	1.60E-07	1.20E-07	8.02E-08	4.01E-08	No
Metals	Dissolved Beryllium	Knik Arm	4.00E-03	1.22E+03	3.27E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	76	1	1	2.49E-07	7.46E-09	0	7.5E-09	0.532	1.95E-10	1.46E-10	9.74E-11	4.87E-11	No
Metals	Dissolved Cadmium	Knik Arm	2.10E-01	1.22E+03	1.72E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	152	1	1	2.61E-05	7.83E-07	0	7.8E-07	0.77	1.41E-08	1.06E-08	7.07E-09	3.53E-09	No
Metals	Dissolved Chromium	Knik Arm	3.63E+00	1.22E+03	2.97E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	64	1	1	1.90E-04	5.70E-06	0	5.7E-06	2.4	3.30E-08	2.48E-08	1.65E-08	8.25E-09	No
Metals	Dissolved Copper	Knik Arm	4.18E+01	1.22E+03	3.42E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	144	1	1	4.92E-03	1.48E-04	0	1.5E-04	5.6	3.66E-07	2.75E-07	1.83E-07	9.16E-08	No
Metals	Dissolved Lead	Knik Arm	1.54E+00	1.22E+03	1.26E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.59E-05	4.78E-07	0	4.8E-07	4.7	1.41E-09	1.06E-09	7.07E-10	3.53E-10	No
Metals	Dissolved Mercury	Knik Arm	8.94E-02	1.22E+03	7.31E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	25036	2.52	12.6	4.61E-03	1.38E-04	0	1.4E-04	1.41	1.36E-06	1.02E-06	6.82E-07	3.41E-07	No
Metals	Dissolved Molybdenum	Knik Arm	4.76E+01	1.22E+03	3.89E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	4.92E-04	1.48E-05	0	1.5E-05	0.52	3.95E-07	2.96E-07	1.97E-07	9.87E-08	No
Metals	Dissolved Nickel	Knik Arm	9.49E+00	1.22E+03	7.76E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	188	1	1	1.46E-03	4.38E-05	0	4.4E-05	1.7	3.58E-07	2.68E-07	1.79E-07	8.95E-08	No
Metals	Dissolved Selenium	Knik Arm	1.00E+00	1.22E+03	8.18E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.03E-05	3.10E-07	0	3.1E-07	0.143	3.02E-08	2.26E-08	1.51E-08	7.54E-09	No
Metals	Dissolved Silver	Knik Arm	4.22E-01	1.22E+03	3.45E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	4.36E-06	1.31E-07	0	1.3E-07	6.02	3.02E-10	2.27E-10	1.51E-10	7.56E-11	No
Metals	Dissolved Thallium	Knik Arm	3.20E-02	1.22E+03	2.62E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	3.31E-07	9.93E-09	0	9.9E-09	0.096	1.44E-09	1.08E-09	7.19E-10	3.59E-10	No
Metals	Dissolved Zinc	Knik Arm	1.24E+02	1.22E+03	1.01E-01	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	188	1	1	1.91E-02	5.72E-04	0	5.7E-04	75.4	1.05E-07	7.91E-08	5.27E-08	2.64E-08	No
Metals	Lead	Knik Arm	4.80E+00	1.22E+03	3.92E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	4.96E-05	1.49E-06	0	1.5E-06	4.7	4.40E-09	3.30E-09	2.20E-09	1.10E-09	No
Metals	Mercury	Knik Arm	1.14E-01	1.22E+03	9.32E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	25036	2.52	12.6	5.88E-03	1.76E-04	0	1.8E-04	1.41	1.74E-06	1.30E-06	8.70E-07	4.35E-07	No
Metals	Molybdenum	Knik Arm	4.87E+01	1.22E+03	3.98E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	5.04E-04	1.51E-05	0	1.5E-05	0.52	4.04E-07	3.03E-07	2.02E-07	1.01E-07	No
Metals	Nickel	Knik Arm	6.70E+00	1.22E+03	5.48E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	188	1	1	1.03E-03	3.09E-05	0	3.1E-05	1.7	2.53E-07	1.89E-07	1.26E-07	6.32E-08	No
Metals	Selenium	Knik Arm	1.20E+00	1.22E+03	9.81E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	19.52	1	1	1.92E-05	5.75E-07	0	5.7E-07	0.143	5.59E-08	4.19E-08	2.79E-08	1.40E-08	No
Metals	Silver	Knik Arm	4.90E-01	1.22E+03	4.01E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	2	1	1	8.01E-07	2.40E-08	0	2.4E-08	6.02	5.55E-11	4.16E-11	2.78E-11	1.39E-11	No
Metals	Thallium	Knik Arm	5.20E-02	1.22E+03	4.25E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	464	1	1	1.97E-05	5.92E-07	0	5.9E-07	0.096	8.57E-08	6.43E-08	4.28E-08	2.14E-08	No
Metals	Zinc	Knik Arm	1.65E+02	1.22E+03	1.35E-01	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	188	1	1	2.54E-02	7.61E-04	0	7.6E-04	75.4	1.40E-07	1.05E-07	7.01E-08	3.51E-08	No
Cyanide	Cyanide, Total	Knik Arm	9.00E+00	1.22E+03	7.36E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	9.31E-05	2.79E-06	0	2.8E-06	0.38	1.02E-07	7.66E-08	5.11E-08	2.55E-08	No
ACE inhibitor	Enalapril	Knik Arm	1.21E-02	1.22E+03	9.89E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.25E-07	3.75E-09	0	3.8E-09	8	6.52E-12	4.89E-12	3.26E-12	1.63E-12	No
Ammonia	Total Ammonia	Knik Arm	3.30E+04	1.22E+03	2.70E+01	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	3.41E-01	1.02E-02	0	1.0E-02	--	--	--	--	--	Uncertainty
Anabolic agent	Androstenedione	Knik Arm	1.62E-01	1.22E+03	1.32E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	121.2	1.028	1.007	1.65E-05	4.95E-07	0	5.0E-07	12	5.74E-10	4.30E-10	2.87E-10	1.43E-10	No
Analgesic	Ibuprofen	Knik Arm	2.09E+01	1.22E+03	1.71E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1.253	1.072	2.71E-04	8.12E-06	0	8.1E-06	1.98	5.70E-08	4.28E-08	2.85E-08	1.43E-08	No
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	Knik Arm	3.87E+01	1.22E+03	3.16E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1.01	1.002	4.04E-04	1.21E-05	0	1.2E-05	5.02	3.36E-08	2.52E-08	1.68E-08	8.39E-09	No
Anti-acid reflux	Ranitidine	Knik Arm	8.44E-02	1.22E+03	6.90E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	8.73E-07	2.62E-08	0	2.6E-08	--	--	--	--	--	Uncertainty
Antiasthmatic	Albuterol	Knik Arm	2.01E-02	1.22E+03	1.64E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	2.08E-07	6.24E-09	0	6.2E-09	8	1.08E-11	8.13E-12	5.42E-12	2.71E-12	No
Antiasthmatic	Theophylline	Knik Arm	5.11E+01	1.22E+03	4.18E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	5.28E-04	1.59E-05	0	1.6E-05	0.9	2.45E-07	1.84E-07	1.22E-07	6.12E-08	No
Antibacterial	Penicillin V	Knik Arm	1.34E-02	1.22E+03	1.10E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1.005	1	1.39E-07	4.18E-09	0	4.2E-09	14	4.15E-12	3.11E-12	2.07E-12	1.04E-12	No
Antibiotic	4-Epitetracycline [ETC]	Knik Arm	6.62E-02	1.22E+03	5.41E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	6.85E-07	2.05E-08	0	2.1E-08	6.4	4.46E-11	3.35E-11	2.23E-11	1.12E-11	No
Antibiotic	Enrofloxacin	Knik Arm	7.08E-04	1.22E+03	5.79E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	7.32E-09	2.20E-10	0	2.2E-10	2	1.53E-12	1.14E-12	7.63E-13	3.82E-13	No
Anticonvulsant	Benztropine	Knik Arm	1.05E-03	1.22E+03	8.59E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1245.2	1.491	1.178	1.59E-06	4.78E-08	0	4.8E-08	0.1	6.65E-09	4.99E-09	3.32E-09	1.66E-09	No
Anticonvulsant	Carbamazepine	Knik Arm	5.06E-01	1.22E+03	4.14E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	76.84	1.01	1.002	3.21E-05	9.63E-07	0	9.6E-07	2.116	6.33E-09	4.75E-09	3.16E-09	1.58E-09	No
Antidepressant	10-hydroxy-amitriptyline	Knik Arm	1.92E-02	1.22E+03	1.57E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	330.56	1.067	1.014	5.54E-06	1.66E-07	0	1.7E-07	--	--	--	--	--	Uncertainty
Antidepressant	Amitriptyline	Knik Arm	7.46E-02	1.22E+03	6.10E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	3275.6	2.78	2.193	5.55E-04	1.67E-05	0	1.7E-05	0.28	8.27E-07	6.20E-07	4.14E-07	2.07E-07	No
Antidiabetic drug	Glipizide	Knik Arm	1.07E-02	1.22E+03	8.75E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	33.828	1	1	2.96E-07	8.88E-09	0	8.9E-09	--	--	--	--	--	Uncertainty
Antidiabetic drug	Glyburide	Knik Arm	1.85E-02	1.22E+03	1.51E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	2689.2	2.452	1.871	9.97E-05	2.99E-06	0	3.0E-06	13	3.20E-09	2.40E-09	1.60E-09	8.00E-10	No
Antidiabetic drug	Metformin	Knik Arm	8.93E+01	1.22E+03	7.30E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	9.24E-04	2.77E-05	0	2.8E-05	0.92	4.19E-07	3.14E-07	2.09E-07	1.05E-07	No
Antifungal agent	Miconazole	Knik Arm	5.62E-02	1.22E+03	4.60E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	24768	12.691	21.677	1.44E-02	4.33E-04	0	4.3E-04	2.076	2.90E-06	2.18E-06	1.45E-06	7.25E-07	No
Antihistamine	Diphenhydramine	Knik Arm	1.68E+00	1.22E+03	1.37E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	267.04	1.053	1.012	3.86E-04	1.16E-05	0	1.2E-05	2	8.05E-08	6.04E-08	4.03E-08	2.01E-08	No
Antihistamine	Promethazine	Knik Arm	3.35E-02	1.22E+03	2.74E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	2771.2	2.452	1.871	1.86E-04	5.58E-06	0	5.6E-06	0.22	3.53E-07	2.65E-07	1.76E-07	8.82E-08	No
Antihypertensive	Diltiazem	Knik Arm	4.06E-01	1.22E+03	3.32E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	112.32	1.01	1.002	3.77E-05	1.13E-06	0	1.1E-06	2.96	5.31E-09	3.98E-09	2.65E-09	1.33E-09	No
Antihypertensive	Valsartan	Knik Arm	1.58E+01	1.22E+03	1.29E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	400	1.128	1.033	5.83E-03	1.75E-04	0	1.7E-04	--	--	--	--	--	Uncertainty
Antihypertensive	Verapamil	Knik Arm	5.12E-02	1.22E+03	4.19E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	588.4	1.161	1.042	2.86E-05	8.58E-07	0	8.6E-07	0.456	2.62E-08	1.96E-08	1.31E-08	6.54E-09	No
Antilipemic	Gemfibrozil	Knik Arm	1.33E+00	1.22E+03	1.09E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	2.452	1.871	3.37E-05	1.01E-06	0	1.0E-06	12.648	1.11E-09	8.34E-10	5.56E-10	2.78E-10	No
Antimicrobial, disinfectant	Triclocarban	Knik Arm	4.89E-03	1.22E+03	4.00E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	3186	2.78	2.193	3.54E-05	1.06E-06	0	1.1E-06	138.4	1.07E-10	8.00E-11	5.34E-11	2.67E-11	No
Antimicrobial, disinfectant	Triclosan	Knik Arm	4.31E+00	1.22E+03	3.52E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	2568.8	2.452	1.871	2.22E-02	6.66E-04	0	6.7E-04	6	1.54E-06	1.16E-06	7.71E-07	3.86E-07	No
Antipyretic, analgesic	Acetaminophen	Knik Arm	1.22E+02	1.22E+03	9.98E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.26E-03	3.79E-05	0	3.8E-05	66.66	7.89E-09	5.92E-09	3.95E-09	1.97E-09	No
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	Knik Arm	5.78E+01	1.22E+03	4.73E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	5.98E-04	1.79E-05	0	1.8E-05	--	--	--	--	--	Uncertainty
Betablocker	Atenolol	Knik Arm	1.88E+00	1.22E+03	1.54E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.94E-05	5.83E-07	0	5.8E-07	8	1.01E-09	7.60E-10	5.07E-10	2.53E-10	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4										
Betablocker	Metoprolol	Knik Arm	4.89E-01	1.22E+03	4.00E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	17.944	1	1	7.17E-06	2.15E-07	0	2.2E-07	4.632	6.46E-10	4.84E-10	3.23E-10	1.61E-10	No
Betablocker	Propranolol	Knik Arm	7.48E-02	1.22E+03	6.12E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	203.96	1.083	1.019	1.35E-05	4.05E-07	0	4.1E-07	1.28	4.40E-09	3.30E-09	2.20E-09	1.10E-09	No
BloodThinner	Warfarin	Knik Arm	4.03E-03	1.22E+03	3.30E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	112.32	1.01	1.002	3.74E-07	1.12E-08	0	1.1E-08	0.0064	2.44E-08	1.83E-08	1.22E-08	6.09E-09	No
ChannelBlocker	Amlodipine	Knik Arm	2.48E-02	1.22E+03	2.03E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	177.2	1.028	1.007	3.69E-06	1.11E-07	0	1.1E-07	2	7.70E-10	5.78E-10	3.85E-10	1.93E-10	No
ChannelBlocker	Dehydronifedipine	Knik Arm	1.40E-03	1.22E+03	1.14E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	222.96	1.042	1.009	2.66E-07	7.98E-09	0	8.0E-09	--	--	--	--	--	Uncertainty
ChannelBlocker	Desmethyldiltiazem	Knik Arm	8.36E-02	1.22E+03	6.84E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	112.32	1.01	1.002	7.75E-06	2.33E-07	0	2.3E-07	--	--	--	--	--	Uncertainty
ChannelBlocker	Norverapamil	Knik Arm	1.89E-02	1.22E+03	1.55E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1970.4	1.95	1.459	5.94E-05	1.78E-06	0	1.8E-06	0.032	7.74E-07	5.80E-07	3.87E-07	1.93E-07	No
Cocaine metabolite	Benzoylecgonine	Knik Arm	1.96E+00	1.22E+03	1.60E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	2.03E-05	6.08E-07	0	6.1E-07	0.3804	2.22E-08	1.67E-08	1.11E-08	5.56E-09	No
Contraceptive	Norgestrel	Knik Arm	8.18E-02	1.22E+03	6.69E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	367.32	1.083	1.019	2.66E-05	7.98E-07	0	8.0E-07	20.04	5.54E-10	4.15E-10	2.77E-10	1.38E-10	No
Corticosteroid	Hydrocortisone	Knik Arm	7.82E-01	1.22E+03	6.39E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	21.444	1	1	1.37E-05	4.11E-07	0	4.1E-07	0.6	9.53E-09	7.15E-09	4.76E-09	2.38E-09	No
Depressant	Alprazolam	Knik Arm	3.23E-03	1.22E+03	2.64E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	46.56	1.005	1	1.24E-07	3.71E-09	0	3.7E-09	2.16	2.39E-11	1.79E-11	1.19E-11	5.96E-12	No
Depressant	Diazepam	Knik Arm	8.27E-04	1.22E+03	6.76E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	134.8	1.028	1.007	9.37E-08	2.81E-09	0	2.8E-09	1.112	3.51E-11	2.64E-11	1.76E-11	8.78E-12	No
Diuretic	Furosemide	Knik Arm	2.08E-01	1.22E+03	1.70E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1.005	1	2.16E-06	6.49E-08	0	6.5E-08	10.4	8.67E-11	6.50E-11	4.33E-11	2.17E-11	No
Diuretic	Hydrochlorothiazide	Knik Arm	1.07E+00	1.22E+03	8.75E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.11E-05	3.32E-07	0	3.3E-07	12.32	3.75E-10	2.81E-10	1.87E-10	9.36E-11	No
Diuretic	Triamterene	Knik Arm	9.41E-02	1.22E+03	7.69E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	9.73E-07	2.92E-08	0	2.9E-08	1.6	2.54E-10	1.90E-10	1.27E-10	6.34E-11	No
Fungicide and parasiticide	Thiabendazole	Knik Arm	3.06E-02	1.22E+03	2.50E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	79.2	1.01	1.002	2.00E-06	6.00E-08	0	6.0E-08	5.2	1.60E-10	1.20E-10	8.02E-11	4.01E-11	No
Glycoside	Digoxin	Knik Arm	7.01E-02	1.22E+03	5.73E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.6	1	1	7.22E-07	2.17E-08	0	2.2E-08	0.07112	4.23E-09	3.18E-09	2.12E-09	1.06E-09	No
Lincosamide antibiotic	Lincomycin	Knik Arm	4.35E-02	1.22E+03	3.56E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	4.50E-07	1.35E-08	0	1.3E-08	3.132	5.99E-11	4.49E-11	2.99E-11	1.50E-11	No
Macrolide antibiotic	Azithromycin	Knik Arm	3.41E-01	1.22E+03	2.79E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	834.4	1.253	1.072	2.92E-04	8.75E-06	0	8.7E-06	12	1.01E-08	7.60E-09	5.06E-09	2.53E-09	No
Macrolide antibiotic	Clarithromycin	Knik Arm	1.65E-01	1.22E+03	1.35E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	225.96	1.042	1.009	3.18E-05	9.53E-07	0	9.5E-07	5.08	2.61E-09	1.96E-09	1.30E-09	6.52E-10	No
Macrolide antibiotic	Erythromycin-H2O	Knik Arm	1.68E-01	1.22E+03	1.37E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	194.12	1.034	1.007	2.76E-05	8.27E-07	0	8.3E-07	10.32	1.11E-09	8.36E-10	5.57E-10	2.79E-10	No
Macrolide antibiotic	Roxithromycin	Knik Arm	9.41E-04	1.22E+03	7.69E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	121.36	1.028	1.007	9.60E-08	2.88E-09	0	2.9E-09	0.8	5.00E-11	3.75E-11	2.50E-11	1.25E-11	No
Macrolide antibiotic	Tylosin	Knik Arm	1.43E-03	1.22E+03	1.17E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	22.108	1	1	2.58E-08	7.75E-10	0	7.8E-10	3.2	3.37E-12	2.53E-12	1.68E-12	8.42E-13	No
Nicotinemetabolite	Cotinine	Knik Arm	2.80E+00	1.22E+03	2.29E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	2.90E-05	8.69E-07	0	8.7E-07	6.416	1.88E-09	1.41E-09	9.41E-10	4.71E-10	No
Non-steroidalanti-inflammatory dr	Naproxen	Knik Arm	1.24E+01	1.22E+03	1.01E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1.042	1.009	1.34E-04	4.01E-06	0	4.0E-06	4.936	1.13E-08	8.47E-09	5.64E-09	2.82E-09	No
Oil & Grease	Oil and Grease, Total (HEM)	Knik Arm	4.27E+04	1.22E+03	3.49E+01	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	0	0	0	0.00E+00	0.00E+00	0	0.0E+00	--	--	--	--	--	Uncertainty
Opiate	Codeine	Knik Arm	1.52E-01	1.22E+03	1.24E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	11.328	1	1	1.41E-06	4.22E-08	0	4.2E-08	1.708	3.44E-10	2.58E-10	1.72E-10	8.59E-11	No
Opiate	Hydrocodone	Knik Arm	6.87E-02	1.22E+03	5.62E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	49.8	1.005	1	2.81E-06	8.43E-08	0	8.4E-08	1.5	7.82E-10	5.86E-10	3.91E-10	1.95E-10	No
Opiate	Oxycodone	Knik Arm	1.60E-01	1.22E+03	1.31E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.65E-06	4.96E-08	0	5.0E-08	1.28	5.39E-10	4.04E-10	2.70E-10	1.35E-10	No
Opiod	Propoxyphene	Knik Arm	1.02E-02	1.22E+03	8.34E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1064.4	1.38	1.13	1.23E-05	3.68E-07	0	3.7E-07	0.54	9.46E-09	7.10E-09	4.73E-09	2.37E-09	No
PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-2	Knik Arm	2.58E-02	1.22E+03	2.11E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	166.84	1.493	0.226	5.25E-06	1.58E-07	0	1.6E-07	2.22	9.87E-10	7.40E-10	4.94E-10	2.47E-10	No
PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	Knik Arm	5.24E-03	1.22E+03	4.28E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	60560	14.355	26.669	3.72E-03	1.12E-04	0	1.1E-04	0.5	3.11E-06	2.33E-06	1.55E-06	7.77E-07	No
PBDEs	2,2',3,4,4',5,5',6-OcBDE	Knik Arm	1.41E-03	1.22E+03	1.15E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	7728	2.732	0.778	2.43E-05	7.30E-07	0	7.3E-07	0.07	1.45E-07	1.09E-07	7.25E-08	3.63E-08	No
PBDEs	2,2',3,4,4',5,6-HpBDE	Knik Arm	6.87E-04	1.22E+03	5.62E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	3393.2	1.493	0.226	2.85E-06	8.54E-08	0	8.5E-08	0.07	1.70E-08	1.27E-08	8.48E-09	4.24E-09	No
PBDEs	2,2',3,4,4',5'-HxBDE	Knik Arm	4.94E-04	1.22E+03	4.04E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	9264	3.296	1.146	1.23E-05	3.70E-07	0	3.7E-07	0.07	7.35E-08	5.51E-08	3.67E-08	1.84E-08	No
PBDEs	2,2',3,4,4',6'-HxBDE	Knik Arm	1.54E-04	1.22E+03	1.26E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	9264	3.296	1.146	3.84E-06	1.15E-07	0	1.2E-07	0.07	2.29E-08	1.72E-08	1.15E-08	5.73E-09	No
PBDEs	2,2',3,4,4'-PeBDE	Knik Arm	1.82E-03	1.22E+03	1.49E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	25280	10.914	14.388	4.11E-04	1.23E-05	0	1.2E-05	0.07	2.45E-06	1.83E-06	1.22E-06	6.11E-07	No
PBDEs	2,2',4,4',5,5'-HxBDE	Knik Arm	3.60E-03	1.22E+03	2.94E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	9264	3.296	1.146	8.99E-05	2.70E-06	0	2.7E-06	0.07	5.35E-07	4.02E-07	2.68E-07	1.34E-07	No
PBDEs	2,2',4,4',5,6'-HxBDE	Knik Arm	3.05E-03	1.22E+03	2.49E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	9264	3.296	1.146	7.61E-05	2.28E-06	0	2.3E-06	0.07	4.54E-07	3.40E-07	2.27E-07	1.13E-07	No
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	Knik Arm	4.06E-02	1.22E+03	3.32E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	60560	14.355	26.669	2.89E-02	8.66E-04	0	8.7E-04	0.058	2.07E-04	1.56E-04	1.04E-04	5.19E-05	No
PBDEs	2,2',4,4',6,6'-HxBDE	Knik Arm	2.13E-04	1.22E+03	1.74E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	9264	3.296	1.146	5.32E-06	1.60E-07	0	1.6E-07	0.07	3.17E-08	2.38E-08	1.58E-08	7.92E-09	No
PBDEs	2,2',4,4',6-PeBDE	Knik Arm	8.11E-03	1.22E+03	6.63E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	25280	10.914	14.388	1.83E-03	5.49E-05	0	5.5E-05	0.07	1.09E-05	8.17E-06	5.45E-06	2.72E-06	No
PBDEs	2,2',4,4'-TeBDE (BDE-47)	Knik Arm	4.32E-02	1.22E+03	3.53E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	54400	14.355	26.669	2.76E-02	8.28E-04	0	8.3E-04	0.07	1.64E-04	1.23E-04	8.22E-05	4.11E-05	No
PBDEs	2,2',4,5'-TeBDE	Knik Arm	1.56E-03	1.22E+03	1.28E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	54400	14.355	26.669	9.96E-04	2.99E-05	0	3.0E-05	0.07	5.93E-06	4.45E-06	2.97E-06	1.48E-06	No
PBDEs	2,2',4,6'-TeBDE	Knik Arm	2.40E-04	1.22E+03	1.96E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	54400	14.355	26.669	1.53E-04	4.60E-06	0	4.6E-06	0.07	9.13E-07	6.85E-07	4.56E-07	2.28E-07	No
PBDEs	2,2',4-TriBDE	Knik Arm	1.11E-03	1.22E+03	9.08E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	14076	9.716	13.964	1.24E-04	3.72E-06	0	3.7E-06	0.07	7.39E-07	5.55E-07	3.70E-07	1.85E-07	No
PBDEs	2,3',4,4',6-PeBDE	Knik Arm	2.02E-04	1.22E+03	1.65E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	25280	10.914	14.388	4.56E-05	1.37E-06	0	1.4E-06	0.07	2.71E-07	2.04E-07	1.36E-07	6.79E-08	No
PBDEs	2,3',4,4'-TeBDE	Knik Arm	1.50E-03	1.22E+03	1.23E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	54400	14.355	26.669	9.58E-04	2.87E-05	0	2.9E-05	0.07	5.71E-06	4.28E-06	2.85E-06	1.43E-06	No
PBDEs	2,3',4',6-TeBDE	Knik Arm	5.58E-04	1.22E+03	4.56E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	54400	14.355	26.669	3.56E-04	1.07E-05	0	1.1E-05	0.07	2.12E-06	1.59E-06	1.06E-06	5.31E-07	No
PBDEs	2,4,4'-TriBDE	Knik Arm	1.35E-03	1.22E+03	1.10E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	14076	9.716	13.964	1.51E-04	4.53E-06	0	4.5E-06	0.07	8.99E-07	6.74E-07	4.50E-07	2.25E-07	No
Pesticides	2,4'-DDD	Knik Arm	1.07E-03	1.22E+03	8.75E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	13944	9.716	13.964	1.19E-04	3.56E-06	0	3.6E-06	0.147	3.36E-07	2.52E-07	1.68E-07	8.41E-08	No
Pesticides	4,4'-DDD	Knik Arm	2.10E-02	1.22E+03	1.72E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	17420	10.556	15.996	3.16E-03	9.47E-05	0	9.5E-05	0.147	8.96E-06	6.72E-06	4.48E-06	2.24E-06	No
Pesticides	4,4'-DDE	Knik Arm	4.70E-03	1.22E+03	3.84E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	36672	13.662	24.604	1.93E-03	5.78E-05	0	5.8E-05	0.147	5.46E-06	4.10E-06	2.73E-06	1.37E-06	No
Pesticides	4,4'-DDT	Knik Arm	1.86E-04	1.22E+03	1.52E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	67360	14.388	26.669	1.47E-04	4.42E-06	0	4.4E-06	0.147	4.18E-07	3.14E-07	2.09E-07	1.05E-07	No
Pesticides	Aldrin	Knik Arm	9.70E-03	1.22E+03	7.93E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	36120	13.662	24.604	3.91E-03	1.17E-04	0	1.2E-04	0.2	8.16E-06	6.12E-06	4.08E-06	2.04E-06	No
Pesticides	Chlordane, alpha (cis)	Knik Arm	1.42E-04	1.22E+03	1.16E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	23604	12.064	19.907	3.31E-05	9.92E-07	0	9.9E-07	0.15	9.19E-08	6.89E-08	4.60E-08	2.30E-08	No
Pesticides	Chlorpyriphos	Knik Arm	9.72E-04	1.22E+03	7.95E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	3480.8	3.181	2.612	8.80E-06	2.64E-07	0	2.6E-07	0.1	3.67E-08	2.75E-08	1.83E-08	9.17E-09	No
Pesticides	Chlorpyriphos-Methyl	Knik Arm	2.11E-04	1.22E+03	1.73E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1296.4	1.491	1.178	3.33E-07	1.00E-08	0	1.0E-08	0.1	1.39E-09	1.04E-09	6.95E-10	3.48E-10	No
Pesticides	Cypermethrin	Knik Arm	4.05E-03	1.22E+03	3.31E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	3881.2	14.388	26.669	1.85E-04	5.55E-06	0	5.5E-06	0.2	3.86E-07	2.89E-07	1.93E-07	9.64E-08	No
Pesticides	DEET	Knik Arm	6.36E+00	1.22E+03	5.20E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	51	1.005	1	2.67E-04	8.00E-06	0	8.0E-06	1	1.11E-07	8.34E-08	5.56E-08	2.78E-08	No
Pesticides	Demeton-O,S	Knik Arm	3.80E-02	1.22E+03	3.11E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	38.352	1	1	1.19E-06	3.57E-08	0	3.6E-08	0.008	6.21E-08	4.66E-08	3.11E-08	1.55E-08	No
Pesticides	Dieldrin	Knik Arm	1.40E-02	1.22E+03	1.14E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	5012	4.188	3.873	2.40E-04	7.21E-06	0	7.2E-06	0.015	6.68E-06	5.01E-06	3.34E-06	1.67E-06	No
Pesticides	Endosulfan Sulfate	Knik Arm	2.20E-02	1.22E+03	1.80E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	482.8	1.128	1.033	9.80E-06	2.94E-07	0	2.9E-07	0.058	7.04E-08	5.28E-08	3.52E-08	1.76E-08	No
Pesticides	Endrin	Knik Arm	6.20E-05	1.22E+03	5.07E-08	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	5012	4.188	3.873	1.06E-06	3.19E-08	0	3.2E-08	0.184	2.41E-09	1.81E-09	1.21E-09	6.03E-10	No
Pesticides	Endrin Ketone	Knik Arm	9.60E-03	1.22E+03	7.85E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	3623.2	3.181	2.612	9.05E-05	2.71E-06	0	2.7E-06	0.184	2.05E-07	1.54E-07	1.03E-07	5.13E-08	No
Pesticides	HCH, alpha	Knik Arm	6.60E-05	1.22E+03	5.40E-08	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1001.6	1.315	1.096	7.11E-08	2.13E-09	0	2.1E-09	87	3.41E-13	2.56E-13	1.70E-13	8.52E-14	No
Pesticides	HCH, beta	Knik Arm	1.09E-04	1.22E+03	8.91E-08	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1001.6	1.315	1.096	1.17E-07	3.52E-09	0	3.5E-09	0.4	1.22E-10	9.18E-11	6.12E-11	3.06E-11	No
Pesticides	HCH, gamma	Knik Arm	6.96E-04	1.22E+03	5.69E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1001.6	1.315	1.096	7.50E-07	2.25E-08	0	2.2E-08	0.014	2.23E-08	1.67E-08	1.12E-08	5.58E-09	No
Pesticides	Heptachlor	Knik Arm	1.40E-02	1.22E+03	1.14E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	7552	6.266	7.079	5.42E-04	1.63E-05	0	1.6E-05	0.2	1.13E-06	8.47E-07	5.65E-07	2.82E-07	No
Pesticides	Hexachlorobenzene	Knik Arm	5.17E-04	1.22E+03	4.23E-07	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	11212	7.962	10.209	3.77E-05	1.13E-06	0	1.1E-06	7.1	2.22E-09	1.66E-09	1.11E-09	5.54E-10	No
Pesticides	Malathion	Knik Arm	5.20E-01	1.22E+03	4.25E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	67	1.01	1.002	2.88E-05	8.63E-07	0	8.6E-07	0.046	2.61E-07	1.96E-07	1.30E-07	6.52E-08	No
Pesticides	Methoxychlor	Knik Arm	2.90E-03	1.22E+03	2.37E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	4176	3.643	3.162	3.61E-05	1.08E-06	0	1.1E-06	1.002	1.50E-08	1.13E-08	7.51E-09	3.75E-09	No
Pesticides	Permethrin	Knik Arm	4.23E-02	1.22E+03	3.46E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1989.2	13.662	24.604	9.40E-04	2.82E-05	0	2.8E-05	5	7.84E-08	5.88E-08	3.92E-08	1.96E-08	No
PFAS	5:3 FTCA	Knik Arm	5.92E-02	1.22E+03	4.84E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1.766	1.334	1.08E-06	3.24E-08	0	3.2E-08	5	9.02E-11	6.76E-11	4.51E-11	2.25E-11	No
PFAS	PFBA	Knik Arm	1.49E-02	1.22E+03	1.22E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1.005	1	1.55E-07	4.65E-09	0	4.6E-09	35	1.85E-12	1.38E-12	9.23E-13	4.61E-13	No
PFAS	PFHpA	Knik Arm	8.47E-03	1.22E+03	6.93E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1.315	1.096	1.15E-07	3.46E-09	0	3.5E-09	--	--	--	--	--	Uncertainty
PFAS	PFHxA	Knik Arm	2.55E-02	1.22E+03	2.09E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1.083	1.019	2.86E-07	8.57E-09	0	8.6E-09	20	5.95E-12	4.47E-12	2.98E-12	1.49E-12	No
PFAS	PFHxS	Knik Arm	3.96E-02	1.22E+03	3.24E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1.042	1.009	4.27E-07	1.28E-08	0	1.3E-08	5.72	3.11E-11	2.33E-11	1.56E-11	7.78E-12	No
PFAS	PFNA	Knik Arm	5.14E-03	1.22E+03	4.20E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	40	6.266	7.079	1.05E-06	3.16E-08	0	3.2E-08	0.166	2.65E-09	1.98E-09	1.32E-09	6.62E-10	No
PFAS	PFOA	Knik Arm	1.85E-02	1.22E+03	1.51E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	2.452	1.871	4.69E-07	1.41E-08	0	1.4E-08	1.75	1.12E-10	8.38E-11	5.59E-11	2.79E-11	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
PFAS	PFOS	Knik Arm	6.53E-02	1.22E+03	5.34E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1.766	1.334	1.19E-06	3.58E-08	0	3.6E-08	0.12	4.14E-09	3.11E-09	2.07E-09	1.04E-09	No
PFAS	PFPeA	Knik Arm	2.03E-02	1.22E+03	1.66E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1.028	1.007	2.16E-07	6.47E-09	0	6.5E-09	--	--	--	--	--	Uncertainty
PFAS	PFPeS	Knik Arm	3.84E-03	1.22E+03	3.14E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1.01	1.002	4.01E-08	1.20E-09	0	1.2E-09	--	--	--	--	--	Uncertainty
Plasticizer	Bisphenol A	Knik Arm	1.59E+00	1.22E+03	1.30E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	288.12	1.053	1.012	3.94E-04	1.18E-05	0	1.2E-05	10	1.64E-08	1.23E-08	8.22E-09	4.11E-09	No
Plasticizer	Bisphenol S	Knik Arm	8.88E-01	1.22E+03	7.26E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	22.672	1	1	1.65E-05	4.94E-07	0	4.9E-07	10	6.86E-10	5.15E-10	3.43E-10	1.72E-10	No
Pyrimidine antibiotic	Trimethoprim	Knik Arm	7.11E-01	1.22E+03	5.81E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	7.35E-06	2.21E-07	0	2.2E-07	0.8	3.83E-09	2.87E-09	1.92E-09	9.58E-10	No
Quinoline antibiotic	Ciprofloxacin	Knik Arm	3.72E-01	1.22E+03	3.04E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	3.85E-06	1.15E-07	0	1.2E-07	4	4.01E-10	3.01E-10	2.01E-10	1.00E-10	No
Quinoline antibiotic	Ofloxacin	Knik Arm	4.27E-01	1.22E+03	3.49E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	4.42E-06	1.32E-07	0	1.3E-07	2	9.21E-10	6.91E-10	4.60E-10	2.30E-10	No
Rubber Stabilizing compound	6PPD-Quinone	Knik Arm	5.30E-03	1.22E+03	4.33E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	781.6	1.253	1.072	4.24E-06	1.27E-07	0	1.3E-07	2	8.85E-10	6.64E-10	4.42E-10	2.21E-10	No
Sex hormone	17 beta-Estradiol	Knik Arm	5.52E-03	1.22E+03	4.51E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	822	1.253	1.072	4.65E-06	1.39E-07	0	1.4E-07	0.01	1.94E-07	1.45E-07	9.69E-08	4.85E-08	No
Sex hormone	Estrone	Knik Arm	3.31E-02	1.22E+03	2.71E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	215.88	1.034	1.007	6.04E-06	1.81E-07	0	1.8E-07	--	--	--	--	--	Uncertainty
Sex hormone	Progesterone	Knik Arm	5.66E-02	1.22E+03	4.63E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	664.4	1.202	1.054	3.70E-05	1.11E-06	0	1.1E-06	0.66	2.34E-08	1.75E-08	1.17E-08	5.84E-09	No
Sex hormone	Testosterone	Knik Arm	7.17E-02	1.22E+03	5.86E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	288.12	1.053	1.012	1.78E-05	5.34E-07	0	5.3E-07	1.72	4.31E-09	3.23E-09	2.16E-09	1.08E-09	No
SSRI Antidepressant	Fluoxetine	Knik Arm	5.20E-02	1.22E+03	4.25E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	616	1.161	1.042	3.04E-05	9.12E-07	0	9.1E-07	1.136	1.12E-08	8.37E-09	5.58E-09	2.79E-09	No
SSRI Antidepressant	Norfluoxetine	Knik Arm	2.73E-02	1.22E+03	2.23E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1068	1.38	1.13	3.29E-05	9.87E-07	0	9.9E-07	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Paroxetine	Knik Arm	1.88E-02	1.22E+03	1.54E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	754.4	1.253	1.072	1.45E-05	4.36E-07	0	4.4E-07	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Sertraline	Knik Arm	1.08E-01	1.22E+03	8.83E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	5716	4.803	4.742	2.42E-03	7.27E-05	0	7.3E-05	--	--	--	--	--	Uncertainty
Statin	Atorvastatin	Knik Arm	2.20E-01	1.22E+03	1.80E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	224.92	13.228	23.281	5.35E-04	1.61E-05	0	1.6E-05	20	1.12E-08	8.37E-09	5.58E-09	2.79E-09	No
Steroid	Methylprednisolone	Knik Arm	1.13E-01	1.22E+03	9.24E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	29.396	1	1	2.72E-06	8.15E-08	0	8.1E-08	8	1.42E-10	1.06E-10	7.08E-11	3.54E-11	No
Steroid	Prednisolone	Knik Arm	9.31E-03	1.22E+03	7.61E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	21.772	1	1	1.66E-07	4.97E-09	0	5.0E-09	6.72	1.03E-11	7.71E-12	5.14E-12	2.57E-12	No
Steroidal Estrogen	Equilenin	Knik Arm	1.34E-02	1.22E+03	1.10E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	726.4	1.202	1.054	9.57E-06	2.87E-07	0	2.9E-07	--	--	--	--	--	Uncertainty
Stimulant	Amphetamine	Knik Arm	5.39E-01	1.22E+03	4.41E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	26.936	1	1	1.19E-05	3.56E-07	0	3.6E-07	0.12	4.13E-08	3.09E-08	2.06E-08	1.03E-08	No
Stimulant	Caffeine	Knik Arm	1.05E+02	1.22E+03	8.59E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.09E-03	3.26E-05	0	3.3E-05	0.508	8.91E-07	6.69E-07	4.46E-07	2.23E-07	No
Stimulant	Cocaine	Knik Arm	7.68E-01	1.22E+03	6.28E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	61.16	1.01	1.002	3.88E-05	1.16E-06	0	1.2E-06	0.396	4.08E-08	3.06E-08	2.04E-08	1.02E-08	No
Streoid	Prednisone	Knik Arm	4.04E-01	1.22E+03	3.30E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	17.076	1	1	5.64E-06	1.69E-07	0	1.7E-07	--	--	--	--	--	Uncertainty
Sulfonamide antibiotic	Sulfadiazine	Knik Arm	1.46E-03	1.22E+03	1.19E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.51E-08	4.53E-10	0	4.5E-10	6	1.05E-12	7.87E-13	5.25E-13	2.62E-13	No
Sulfonamide antibiotic	Sulfamethizole	Knik Arm	5.11E-03	1.22E+03	4.18E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	5.28E-08	1.59E-09	0	1.6E-09	14	1.57E-12	1.18E-12	7.87E-13	3.94E-13	No
Sulfonamide antibiotic	Sulfamethoxazole	Knik Arm	1.08E+00	1.22E+03	8.83E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.12E-05	3.35E-07	0	3.4E-07	9.2	5.06E-10	3.80E-10	2.53E-10	1.27E-10	No
Sulfonamide antibiotic	Sulfanilamide	Knik Arm	3.48E-02	1.22E+03	2.85E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	3.60E-07	1.08E-08	0	1.1E-08	12	1.25E-11	9.38E-12	6.25E-12	3.13E-12	No
SVOCs/PAHs	1,2-Diphenylhydrazine	Knik Arm	2.50E+00	1.22E+03	2.04E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	161.76	1.028	1.007	3.40E-04	1.02E-05	0	1.0E-05	--	--	--	--	--	Uncertainty
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	Knik Arm	1.00E-01	1.22E+03	8.18E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	2775.2	2.452	1.871	5.56E-04	1.67E-05	0	1.7E-05	65.6	3.54E-09	2.65E-09	1.77E-09	8.84E-10	No
SVOCs/PAHs	1-Methyldibenzothiophene	Knik Arm	5.00E-02	1.22E+03	4.09E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	2390	2.175	1.633	2.13E-04	6.38E-06	0	6.4E-06	65.6	1.35E-09	1.01E-09	6.75E-10	3.38E-10	No
SVOCs/PAHs	1-Methylfluorene	Knik Arm	5.00E-02	1.22E+03	4.09E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	3534	3.181	2.612	4.60E-04	1.38E-05	0	1.4E-05	65.6	2.92E-09	2.19E-09	1.46E-09	7.30E-10	No
SVOCs/PAHs	1-Methylnaphthalene	Knik Arm	4.27E-01	1.22E+03	3.49E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	664.4	1.202	1.054	2.79E-04	8.36E-06	0	8.4E-06	0.94	1.24E-07	9.28E-08	6.18E-08	3.09E-08	No
SVOCs/PAHs	1-Methylphenanthrene	Knik Arm	2.85E-02	1.22E+03	2.33E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	19132	3.643	3.162	1.62E-03	4.87E-05	0	4.9E-05	65.6	1.03E-08	7.74E-09	5.16E-09	2.58E-09	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Knik Arm	1.20E+00	1.22E+03	9.81E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	505.6	1.128	1.033	5.60E-04	1.68E-05	0	1.7E-05	3	7.78E-08	5.83E-08	3.89E-08	1.94E-08	No
SVOCs/PAHs	2,6-Dimethylnaphthalene	Knik Arm	3.44E-01	1.22E+03	2.81E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1296.4	1.491	1.178	5.44E-04	1.63E-05	0	1.6E-05	65.6	3.46E-09	2.59E-09	1.73E-09	8.64E-10	No
SVOCs/PAHs	2-Methylanthracene	Knik Arm	6.36E-02	1.22E+03	5.20E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	3698.8	3.181	2.612	6.12E-04	1.84E-05	0	1.8E-05	65.6	3.89E-09	2.92E-09	1.94E-09	9.72E-10	No
SVOCs/PAHs	2-Methylfluoranthene	Knik Arm	1.74E-02	1.22E+03	1.42E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	7672	6.266	7.079	6.84E-04	2.05E-05	0	2.1E-05	65.6	4.35E-09	3.26E-09	2.17E-09	1.09E-09	No
SVOCs/PAHs	2-Methylnaphthalene	Knik Arm	5.41E-01	1.22E+03	4.42E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	654.4	1.202	1.054	3.48E-04	1.04E-05	0	1.0E-05	65.6	2.21E-09	1.66E-09	1.11E-09	5.53E-10	No
SVOCs/PAHs	2-Methylphenanthrene	Knik Arm	6.47E-02	1.22E+03	5.29E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	13696	2.78	2.193	2.01E-03	6.04E-05	0	6.0E-05	65.6	1.28E-08	9.60E-09	6.40E-09	3.20E-09	No
SVOCs/PAHs	3,6-Dimethylphenanthrene	Knik Arm	1.89E-02	1.22E+03	1.55E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	33036	5.502	5.821	2.81E-03	8.43E-05	0	8.4E-05	65.6	1.79E-08	1.34E-08	8.93E-09	4.46E-09	No
SVOCs/PAHs	3-Methylphenanthrene	Knik Arm	5.79E-02	1.22E+03	4.73E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	13696	2.78	2.193	1.80E-03	5.41E-05	0	5.4E-05	65.6	1.15E-08	8.59E-09	5.73E-09	2.86E-09	No
SVOCs/PAHs	4-Methyldibenzothiophene	Knik Arm	2.29E-02	1.22E+03	1.87E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	2390	2.175	1.633	9.73E-05	2.92E-06	0	2.9E-06	65.6	6.19E-10	4.64E-10	3.09E-10	1.55E-10	No
SVOCs/PAHs	Acenaphthene	Knik Arm	8.21E-02	1.22E+03	6.71E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	716.8	1.202	1.054	5.78E-05	1.74E-06	0	1.7E-06	65.6	3.68E-10	2.76E-10	1.84E-10	9.19E-11	No
SVOCs/PAHs	Acenaphthylene	Knik Arm	1.25E-02	1.22E+03	1.02E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	739.2	1.202	1.054	9.08E-06	2.72E-07	0	2.7E-07	65.6	5.77E-11	4.33E-11	2.89E-11	1.44E-11	No
SVOCs/PAHs	Anthracene	Knik Arm	5.53E-02	1.22E+03	4.52E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1604	1.766	1.334	1.28E-04	3.84E-06	0	3.8E-06	65.6	8.14E-10	6.11E-10	4.07E-10	2.04E-10	No
SVOCs/PAHs	Benz(a)anthracene	Knik Arm	2.50E-01	1.22E+03	2.04E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	11736	8.841	12.05	2.12E-02	6.36E-04	0	6.4E-04	0.62	1.43E-05	1.07E-05	7.13E-06	3.57E-06	No
SVOCs/PAHs	Benzo(a)fluoranthene	Knik Arm	1.51E-02	1.22E+03	1.23E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12096	8.841	12.05	1.32E-03	3.96E-05	0	4.0E-05	0.615	8.95E-07	6.71E-07	4.48E-07	2.24E-07	No
SVOCs/PAHs	Benzo(a)pyrene	Knik Arm	5.63E-02	1.22E+03	4.60E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	20588	11.337	17.783	1.07E-02	3.22E-04	0	3.2E-04	0.62	7.23E-06	5.42E-06	3.61E-06	1.81E-06	No
SVOCs/PAHs	Benzo(b)fluoranthene	Knik Arm	4.90E-02	1.22E+03	4.01E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12096	8.841	12.05	4.28E-03	1.29E-04	0	1.3E-04	0.62	2.88E-06	2.16E-06	1.44E-06	7.20E-07	No
SVOCs/PAHs	Benzo(b)fluorene	Knik Arm	4.06E-02	1.22E+03	3.32E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	11916	8.841	12.05	3.50E-03	1.05E-04	0	1.0E-04	0.615	2.37E-06	1.78E-06	1.19E-06	5.93E-07	No
SVOCs/PAHs	Benzo(e)pyrene	Knik Arm	5.23E-02	1.22E+03	4.28E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	32976	13.228	23.281	1.87E-02	5.60E-04	0	5.6E-04	0.615	1.26E-05	9.49E-06	6.32E-06	3.16E-06	No
SVOCs/PAHs	Benzo(g,h,i)perylene	Knik Arm	8.33E-02	1.22E+03	6.81E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	44000	13.98	25.645	4.19E-02	1.26E-03	0	1.3E-03	14.4	1.21E-06	9.10E-07	6.07E-07	3.03E-07	No
SVOCs/PAHs	Benzo(k,j)fluoranthene	Knik Arm	3.34E-02	1.22E+03	2.73E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	19972	11.337	17.783	6.18E-03	1.86E-04	0	1.9E-04	0.615	4.19E-06	3.14E-06	2.10E-06	1.05E-06	No
SVOCs/PAHs	Benzothiophene	Knik Arm	1.44E-02	1.22E+03	1.18E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	212.64	1.034	1.007	2.59E-06	7.77E-08	0	7.8E-08	0.615	1.76E-09	1.32E-09	8.78E-10	4.39E-10	No
SVOCs/PAHs	Biphenyl	Knik Arm	1.02E-01	1.22E+03	8.34E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	822	1.253	1.072	8.59E-05	2.58E-06	0	2.6E-06	0.615	5.82E-08	4.37E-08	2.91E-08	1.46E-08	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Knik Arm	9.50E+01	1.22E+03	7.77E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	6848	11.708	16.749	6.23E+00	1.87E-01	0	1.9E-01	18.3	1.42E-04	1.06E-04	7.10E-05	3.55E-05	No
SVOCs/PAHs	Butyl Benzyl Phthalate	Knik Arm	5.62E+00	1.22E+03	4.60E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	2454.4	2.175	1.633	2.45E-02	7.36E-04	0	7.4E-04	159	6.43E-08	4.83E-08	3.22E-08	1.61E-08	No
SVOCs/PAHs	Carbazole	Knik Arm	2.01E-01	1.22E+03	1.64E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	529.2	1.128	1.033	9.81E-05	2.94E-06	0	2.9E-06	0.615	6.65E-08	4.99E-08	3.33E-08	1.66E-08	No
SVOCs/PAHs	Chrysene/Triphenylene	Knik Arm	6.14E-02	1.22E+03	5.02E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12660	8.841	12.05	5.62E-03	1.69E-04	0	1.7E-04	0.615	3.81E-06	2.86E-06	1.91E-06	9.53E-07	No
SVOCs/PAHs	cis/trans Decalin	Knik Arm	4.84E-01	1.22E+03	3.96E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1091.2	1.38	1.13	5.96E-04	1.79E-05	0	1.8E-05	16.68	1.49E-08	1.12E-08	7.45E-09	3.72E-09	No
SVOCs/PAHs	Dibenzo(a,h)anthracene	Knik Arm	6.68E-03	1.22E+03	5.46E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	38384	13.662	24.604	2.86E-03	8.59E-05	0	8.6E-05	2.66	4.49E-07	3.37E-07	2.25E-07	1.12E-07	No
SVOCs/PAHs	Dibenzofuran	Knik Arm	6.98E-02	1.22E+03	5.71E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	971.6	1.315	1.096	7.29E-05	2.19E-06	0	2.2E-06	0.615	4.94E-08	3.71E-08	2.47E-08	1.24E-08	No
SVOCs/PAHs	Dibenzothiophene	Knik Arm	3.35E-02	1.22E+03	2.74E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1442	1.614	1.242	6.38E-05	1.91E-06	0	1.9E-06	1.04	2.56E-08	1.92E-08	1.28E-08	6.39E-09	No
SVOCs/PAHs	Diethyl Phthalate	Knik Arm	3.70E+00	1.22E+03	3.03E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	73.4	1.01	1.002	2.24E-04	6.73E-06	0	6.7E-06	4600	2.03E-11	1.52E-11	1.02E-11	5.08E-12	No
SVOCs/PAHs	Dimethyl Phthalate	Knik Arm	1.20E-01	1.22E+03	9.81E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	21.124	1	1	2.07E-06	6.22E-08	0	6.2E-08	68	1.27E-11	9.53E-12	6.36E-12	3.18E-12	No
SVOCs/PAHs	Di-n-butyl Phthalate	Knik Arm	8.40E-01	1.22E+03	6.87E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1730.4	1.766	1.334	2.10E-03	6.30E-05	0	6.3E-05	1340	6.53E-10	4.90E-10	3.27E-10	1.63E-10	No
SVOCs/PAHs	Di-n-octyl Phthalate	Knik Arm	1.89E+01	1.22E+03	1.55E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	3895.6	7.278	6.012	4.38E-01	1.31E-02	0	1.3E-02	36.8	4.96E-06	3.72E-06	2.48E-06	1.24E-06	No
SVOCs/PAHs	Fluoranthene	Knik Arm	3.17E-01	1.22E+03	2.59E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	4716	4.188	3.873	5.12E-03	1.54E-04	0	1.5E-04	125	1.71E-08	1.28E-08	8.54E-09	4.27E-09	No
SVOCs/PAHs	Fluorene	Knik Arm	1.26E-01	1.22E+03	1.03E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	1064.4	1.38	1.13	1.51E-04	4.54E-06	0	4.5E-06	125	5.05E-10	3.79E-10	2.52E-10	1.26E-10	No
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	Knik Arm	4.44E-02	1.22E+03	3.63E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	48720	14.223	26.363	2.52E-02	7.55E-04	0	7.5E-04	7.2	1.46E-06	1.09E-06	7.28E-07	3.64E-07	No
SVOCs/PAHs	Isophorone	Knik Arm	3.80E-01	1.22E+03	3.11E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	24.588	1	1	7.64E-06	2.29E-07	0	2.3E-07	150	2.12E-11	1.59E-11	1.06E-11	5.31E-12	No
SVOCs/PAHs	Naphthalene	Knik Arm	9.80E-01	1.22E+03	8.01E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	279.52	1.053	1.012	2.36E-04	7.08E-06	0	7.1E-06	71	1.39E-09	1.04E-09	6.93E-10	3.46E-10	No
SVOCs/PAHs	Naphthobenzothiophene	Knik Arm	3.37E-02	1.22E+03	2.76E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	4936	4.188	3.873	5.70E-04	1.71E-05	0	1.7E-05	0.615	3.86E-07	2.90E-07	1.93E-07	9.66E-08	No
SVOCs/PAHs	N-Nitrosodimethylamine	Knik Arm	9.60E+00	1.22E+03	7.85E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	9.93E-05	2.98E-06	0	3.0E-06	0.005	8.28E-06	6.21E-06	4.14E-06	2.07E-06	No
SVOCs/PAHs	Pentachlorophenol (PCP)	Knik Arm	6.30E+00	1.22E+03	5.15E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	4440	3.643	3.162	8.33E-02	2.50E-03	0	2.5E-03	8.42	4.13E-06	3.09E-06	2.06E-06	1.03E-06	No
SVOCs/PAHs	Perylene	Knik Arm	3.33E-02	1.22E+03	2.72E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	24708	12.691	21.677	8.54E-03	2.56E-04	0	2.6E-04	0.615	5.79E-06	4.34E-06	2.89E-06	1.45E-06	No
SVOCs/PAHs	Phenanthrene	Knik Arm	9.80E-01	1.22E+03	8.01E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	7460	1.766	1.334	1.06E-02	3.17E-04	0	3.2E-04	65.6	6.71E-08	5.03E-08	3.36E-08	1.68E-08	No
SVOCs/PAHs	Phenol	Knik Arm	5.45E+01	1.22E+03	4.46E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	17.076	1	1	7.61E-04	2.28E-05	0	2.3E-05	60	5.29E-09	3.97E-09	2.64E-09	1.32E-09	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
SVOCs/PAHs	Pyrene	Knik Arm	4.70E-01	1.22E+03	3.84E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	3082.4	2.78	2.193	3.29E-03	9.88E-05	0	9.9E-05	0.615	2.23E-06	1.67E-06	1.12E-06	5.58E-07	No
SVOCs/PAHs	Retene	Knik Arm	1.08E-02	1.22E+03	8.83E-06	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	131400	12.691	21.677	1.47E-02	4.42E-04	0	4.4E-04	65.6	9.36E-08	7.02E-08	4.68E-08	2.34E-08	No
Tetracycline antibiotic	Doxycycline	Knik Arm	1.50E-01	1.22E+03	1.23E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.55E-06	4.65E-08	0	4.7E-08	4.0298	1.61E-10	1.20E-10	8.03E-11	4.01E-11	No
Tetracycline antibiotic	Tetracycline [TC]	Knik Arm	9.79E-02	1.22E+03	8.00E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.01E-06	3.04E-08	0	3.0E-08	6.4	6.60E-11	4.95E-11	3.30E-11	1.65E-11	No
Tranquilizer	Meprobamate	Knik Arm	3.83E-01	1.22E+03	3.13E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	3.96E-06	1.19E-07	0	1.2E-07	3	5.51E-10	4.13E-10	2.75E-10	1.38E-10	No
Urinary steroid	Androsterone	Knik Arm	5.71E-02	1.22E+03	4.67E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	505.6	1.128	1.033	2.66E-05	7.99E-07	0	8.0E-07	200	5.55E-11	4.16E-11	2.78E-11	1.39E-11	No
VOCs	1,1,1-Trichloroethane (TCA)	Knik Arm	7.90E-01	1.22E+03	6.46E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	81.64	1.01	1.002	5.33E-05	1.60E-06	0	1.6E-06	999	2.22E-11	1.67E-11	1.11E-11	5.56E-12	No
VOCs	1,2-Dichloroethane (EDC)	Knik Arm	8.00E-02	1.22E+03	6.54E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	17.604	1	1	1.15E-06	3.45E-08	0	3.5E-08	382	1.26E-12	9.43E-13	6.29E-13	3.14E-13	No
VOCs	1,4-Dichlorobenzene	Knik Arm	8.40E-01	1.22E+03	6.87E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	345.76	1.067	1.014	2.53E-04	7.60E-06	0	7.6E-06	2.5	4.23E-08	3.17E-08	2.11E-08	1.06E-08	No
VOCs	2-Butanone (MEK)	Knik Arm	6.80E+01	1.22E+03	5.56E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	7.03E-04	2.11E-05	0	2.1E-05	1771	1.66E-10	1.24E-10	8.28E-11	4.14E-11	No
VOCs	2-Hexanone	Knik Arm	5.70E+00	1.22E+03	4.66E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	15.12	1	1	7.05E-05	2.11E-06	0	2.1E-06	8.27	3.55E-09	2.66E-09	1.78E-09	8.88E-10	No
VOCs	Acetone	Knik Arm	3.00E+02	1.22E+03	2.45E-01	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	3.10E-03	9.31E-05	0	9.3E-05	20	6.47E-08	4.85E-08	3.23E-08	1.62E-08	No
VOCs	Acrolein	Knik Arm	1.30E+00	1.22E+03	1.06E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.34E-05	4.03E-07	0	4.0E-07	0.05	1.12E-07	8.41E-08	5.61E-08	2.80E-08	No
VOCs	Benzene	Knik Arm	7.80E-01	1.22E+03	6.38E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	47.24	1.005	1	3.03E-05	9.08E-07	0	9.1E-07	26.36	4.79E-10	3.59E-10	2.39E-10	1.20E-10	No
VOCs	Bromodichloromethane	Knik Arm	8.00E-02	1.22E+03	6.54E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	38.784	1.005	1	2.55E-06	7.65E-08	0	7.6E-08	3.58	2.97E-10	2.23E-10	1.48E-10	7.42E-11	No
VOCs	Bromomethane	Knik Arm	9.00E-02	1.22E+03	7.36E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	11.328	1	1	8.34E-07	2.50E-08	0	2.5E-08	0.284	1.22E-09	9.18E-10	6.12E-10	3.06E-10	No
VOCs	Carbon Disulfide	Knik Arm	7.00E-01	1.22E+03	5.72E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	35.404	1	1	2.03E-05	6.08E-07	0	6.1E-07	11	7.68E-10	5.76E-10	3.84E-10	1.92E-10	No
VOCs	Chlorobenzene	Knik Arm	8.00E-02	1.22E+03	6.54E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	138.96	1.028	1.007	9.34E-06	2.80E-07	0	2.8E-07	19	2.05E-10	1.54E-10	1.03E-10	5.13E-11	No
VOCs	Chloroethane	Knik Arm	6.90E-01	1.22E+03	5.64E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	16.316	1	1	9.21E-06	2.76E-07	0	2.8E-07	--	--	--	--	--	Uncertainty
VOCs	Chloroform	Knik Arm	3.95E+00	1.22E+03	3.23E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	37.056	1	1	1.20E-04	3.59E-06	0	3.6E-06	2.58	1.93E-08	1.45E-08	9.67E-09	4.84E-09	No
VOCs	Chloromethane	Knik Arm	1.90E+00	1.22E+03	1.55E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.648	1	1	1.96E-05	5.89E-07	0	5.9E-07	3.2	2.56E-09	1.92E-09	1.28E-09	6.40E-10	No
VOCs	cis-1,2-Dichloroethene	Knik Arm	7.00E-02	1.22E+03	5.72E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	38.784	1.005	1	2.23E-06	6.69E-08	0	6.7E-08	90.4	1.03E-11	7.72E-12	5.15E-12	2.57E-12	No
VOCs	Dichloromethane (Methylene Chlori	Knik Arm	6.85E+00	1.22E+03	5.60E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	12.412	1	1	6.95E-05	2.09E-06	0	2.1E-06	5.85	4.96E-09	3.72E-09	2.48E-09	1.24E-09	No
VOCs	Ethylbenzene	Knik Arm	1.50E+00	1.22E+03	1.23E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	222.56	1.042	1.009	2.84E-04	8.53E-06	0	8.5E-06	97.1	1.22E-09	9.16E-10	6.11E-10	3.05E-10	No
VOCs	m,p-Xylenes	Knik Arm	6.20E+00	1.22E+03	5.07E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	226	1.042	1.009	1.19E-03	3.58E-05	0	3.6E-05	2.1	2.37E-07	1.78E-07	1.19E-07	5.93E-08	No
VOCs	o-Xylene	Knik Arm	2.60E+00	1.22E+03	2.13E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	225.96	1.042	1.009	5.01E-04	1.50E-05	0	1.5E-05	2.1	9.94E-08	7.45E-08	4.97E-08	2.48E-08	No
VOCs	Styrene	Knik Arm	5.50E+00	1.22E+03	4.50E-03	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	164.24	1.028	1.007	7.59E-04	2.28E-05	0	2.3E-05	200	1.58E-09	1.19E-09	7.92E-10	3.96E-10	No
VOCs	Tetrachloroethene (PCE)	Knik Arm	6.00E-01	1.22E+03	4.91E-04	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	325.36	1.067	1.014	1.70E-04	5.11E-06	0	5.1E-06	63	1.13E-09	8.45E-10	5.64E-10	2.82E-10	No
VOCs	Toluene	Knik Arm	1.60E+01	1.22E+03	1.31E-02	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	117.56	1.01	1.002	1.55E-03	4.66E-05	0	4.7E-05	26	2.49E-08	1.87E-08	1.25E-08	6.23E-09	No
VOCs	Trichloroethene (TCE)	Knik Arm	7.00E-02	1.22E+03	5.72E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	73.4	1.01	1.002	4.24E-06	1.27E-07	0	1.3E-07	2.8	6.32E-10	4.74E-10	3.16E-10	1.58E-10	No
VOCs	Vinyl Chloride	Knik Arm	2.00E-02	1.22E+03	1.64E-05	Beluga Whale	1428	0.03	0	0.0139	1	1	0	model	21.884	1	1	3.58E-07	1.07E-08	0	1.1E-08	0.17	8.78E-10	6.58E-10	4.39E-10	2.19E-10	No
Metals	Antimony	Knik Arm	9.04E-01	1.22E+03	7.39E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	4	1	1	2.96E-06	2.37E-07	0	2.4E-07	0.059	2.45E-06	1.84E-06	1.22E-06	6.12E-07	No
Metals	Arsenic	Knik Arm	3.42E+00	1.22E+03	2.80E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	176	1	1	4.92E-04	3.94E-05	0	3.9E-05	1.04	2.31E-05	1.73E-05	1.16E-05	5.78E-06	No
Metals	Beryllium	Knik Arm	1.80E-02	1.22E+03	1.47E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	76	1	1	1.12E-06	8.95E-08	0	8.9E-08	0.532	1.03E-07	7.71E-08	5.14E-08	2.57E-08	No
Metals	Cadmium	Knik Arm	3.09E-01	1.22E+03	2.53E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	152	1	1	3.84E-05	3.07E-06	0	3.1E-06	0.77	2.44E-06	1.83E-06	1.22E-06	6.09E-07	No
Metals	Chromium	Knik Arm	3.46E+00	1.22E+03	2.83E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	64	1	1	1.81E-04	1.45E-05	0	1.4E-05	2.4	3.69E-06	2.77E-06	1.84E-06	9.22E-07	No
Metals	Copper	Knik Arm	1.15E+02	1.22E+03	9.40E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	144	1	1	1.35E-02	1.08E-03	0	1.1E-03	5.6	1.18E-04	8.86E-05	5.91E-05	2.95E-05	No
Metals	Dissolved Antimony	Knik Arm	8.06E-01	1.22E+03	6.59E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	4	1	1	2.64E-06	2.11E-07	0	2.1E-07	0.059	2.18E-06	1.64E-06	1.09E-06	5.46E-07	No
Metals	Dissolved Arsenic	Knik Arm	2.78E+00	1.22E+03	2.27E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	176	1	1	4.00E-04	3.20E-05	0	3.2E-05	1.04	1.88E-05	1.41E-05	9.40E-06	4.70E-06	No
Metals	Dissolved Beryllium	Knik Arm	4.00E-03	1.22E+03	3.27E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	76	1	1	2.49E-07	1.99E-08	0	2.0E-08	0.532	2.28E-08	1.71E-08	1.14E-08	5.71E-09	No
Metals	Dissolved Cadmium	Knik Arm	2.10E-01	1.22E+03	1.72E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	152	1	1	2.61E-05	2.09E-06	0	2.1E-06	0.77	1.66E-06	1.24E-06	8.28E-07	4.14E-07	No
Metals	Dissolved Chromium	Knik Arm	3.63E+00	1.22E+03	2.97E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	64	1	1	1.90E-04	1.52E-05	0	1.5E-05	2.4	3.87E-06	2.90E-06	1.93E-06	9.67E-07	No
Metals	Dissolved Copper	Knik Arm	4.18E+01	1.22E+03	3.42E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	144	1	1	4.92E-03	3.94E-04	0	3.9E-04	5.6	4.30E-05	3.22E-05	2.15E-05	1.07E-05	No
Metals	Dissolved Lead	Knik Arm	1.54E+00	1.22E+03	1.26E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.59E-05	1.27E-06	0	1.3E-06	4.7	1.66E-07	1.24E-07	8.28E-08	4.14E-08	No
Metals	Dissolved Mercury	Knik Arm	8.94E-02	1.22E+03	7.31E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	25036	2.52	12.6	4.61E-03	3.69E-04	0	3.7E-04	1.41	1.60E-04	1.20E-04	7.99E-05	4.00E-05	No
Metals	Dissolved Molybdenum	Knik Arm	4.76E+01	1.22E+03	3.89E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	4.92E-04	3.94E-05	0	3.9E-05	0.52	4.63E-05	3.47E-05	2.31E-05	1.16E-05	No
Metals	Dissolved Nickel	Knik Arm	9.49E+00	1.22E+03	7.76E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	188	1	1	1.46E-03	1.17E-04	0	1.2E-04	1.7	4.19E-05	3.15E-05	2.10E-05	1.05E-05	No
Metals	Dissolved Selenium	Knik Arm	1.00E+00	1.22E+03	8.18E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.03E-05	8.27E-07	0	8.3E-07	0.143	3.53E-06	2.65E-06	1.77E-06	8.84E-07	No
Metals	Dissolved Silver	Knik Arm	4.22E-01	1.22E+03	3.45E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	4.36E-06	3.49E-07	0	3.5E-07	6.02	3.54E-08	2.66E-08	1.77E-08	8.86E-09	No
Metals	Dissolved Thallium	Knik Arm	3.20E-02	1.22E+03	2.62E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	3.31E-07	2.65E-08	0	2.6E-08	0.096	1.68E-07	1.26E-07	8.42E-08	4.21E-08	No
Metals	Dissolved Zinc	Knik Arm	1.24E+02	1.22E+03	1.01E-01	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	188	1	1	1.91E-02	1.52E-03	0	1.5E-03	75.4	1.24E-05	9.27E-06	6.18E-06	3.09E-06	No
Metals	Lead	Knik Arm	4.80E+00	1.22E+03	3.92E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	4.96E-05	3.97E-06	0	4.0E-06	4.7	5.16E-07	3.87E-07	2.58E-07	1.29E-07	No
Metals	Mercury	Knik Arm	1.14E-01	1.22E+03	9.32E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	25036	2.52	12.6	5.88E-03	4.70E-04	0	4.7E-04	1.41	2.04E-04	1.53E-04	1.02E-04	5.10E-05	No
Metals	Molybdenum	Knik Arm	4.87E+01	1.22E+03	3.98E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	5.04E-04	4.03E-05	0	4.0E-05	0.52	4.73E-05	3.55E-05	2.37E-05	1.18E-05	No
Metals	Nickel	Knik Arm	6.70E+00	1.22E+03	5.48E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	188	1	1	1.03E-03	8.24E-05	0	8.2E-05	1.7	2.96E-05	2.22E-05	1.48E-05	7.40E-06	No
Metals	Selenium	Knik Arm	1.20E+00	1.22E+03	9.81E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	19.52	1	1	1.92E-05	1.53E-06	0	1.5E-06	0.143	6.55E-06	4.91E-06	3.27E-06	1.64E-06	No
Metals	Silver	Knik Arm	4.90E-01	1.22E+03	4.01E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	2	1	1	8.01E-07	6.41E-08	0	6.4E-08	6.02	6.51E-09	4.88E-09	3.25E-09	1.63E-09	No
Metals	Thallium	Knik Arm	5.20E-02	1.22E+03	4.25E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	464	1	1	1.97E-05	1.58E-06	0	1.6E-06	0.096	1.00E-05	7.53E-06	5.02E-06	2.51E-06	No
Metals	Zinc	Knik Arm	1.65E+02	1.22E+03	1.35E-01	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	188	1	1	2.54E-02	2.03E-03	0	2.0E-03	75.4	1.64E-05	1.23E-05	8.22E-06	4.11E-06	No
Cyanide	Cyanide, Total	Knik Arm	9.00E+00	1.22E+03	7.36E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	9.31E-05	7.45E-06	0	7.4E-06	0.38	1.20E-05	8.98E-06	5.99E-06	2.99E-06	No
ACE inhibitor	Enalapril	Knik Arm	1.21E-02	1.22E+03	9.89E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.25E-07	1.00E-08	0	1.0E-08	8	7.65E-10	5.73E-10	3.82E-10	1.91E-10	No
Ammonia	Total Ammonia	Knik Arm	3.30E+04	1.22E+03	2.70E+01	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	3.41E-01	2.73E-02	0	2.7E-02	--	--	--	--	--	Uncertainty
Anabolic agent	Androstenedione	Knik Arm	1.62E-01	1.22E+03	1.32E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	121.2	1.028	1.007	1.65E-05	1.32E-06	0	1.3E-06	12	6.72E-08	5.04E-08	3.36E-08	1.68E-08	No
Analgesic	Ibuprofen	Knik Arm	2.09E+01	1.22E+03	1.71E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1.253	1.072	2.71E-04	2.17E-05	0	2.2E-05	1.98	6.69E-06	5.01E-06	3.34E-06	1.67E-06	No
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	Knik Arm	3.87E+01	1.22E+03	3.16E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1.01	1.002	4.04E-04	3.23E-05	0	3.2E-05	5.02	3.94E-06	2.95E-06	1.97E-06	9.84E-07	No
Anti-acid reflux	Ranitidine	Knik Arm	8.44E-02	1.22E+03	6.90E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	8.73E-07	6.98E-08	0	7.0E-08	--	--	--	--	--	Uncertainty
Antiasthmatic	Albuterol	Knik Arm	2.01E-02	1.22E+03	1.64E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	2.08E-07	1.66E-08	0	1.7E-08	8	1.27E-09	9.53E-10	6.35E-10	3.18E-10	No
Antiasthmatic	Theophylline	Knik Arm	5.11E+01	1.22E+03	4.18E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	5.28E-04	4.23E-05	0	4.2E-05	0.9	2.87E-05	2.15E-05	1.44E-05	7.18E-06	No
Antibacterial	Penicillin V	Knik Arm	1.34E-02	1.22E+03	1.10E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1.005	1	1.39E-07	1.11E-08	0	1.1E-08	14	4.86E-10	3.65E-10	2.43E-10	1.22E-10	No
Antibiotic	4-Epitetracycline [ETC]	Knik Arm	6.62E-02	1.22E+03	5.41E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	6.85E-07	5.48E-08	0	5.5E-08	6.4	5.23E-09	3.92E-09	2.61E-09	1.31E-09	No
Antibiotic	Enrofloxacin	Knik Arm	7.08E-04	1.22E+03	5.79E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	7.32E-09	5.86E-10	0	5.9E-10	2	1.79E-10	1.34E-10	8.95E-11	4.47E-11	No
Anticonvulsant	Benztropine	Knik Arm	1.05E-03	1.22E+03	8.59E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1245.2	1.491	1.178	1.59E-06	1.28E-07	0	1.3E-07	0.1	7.79E-07	5.84E-07	3.90E-07	1.95E-07	No
Anticonvulsant	Carbamazepine	Knik Arm	5.06E-01	1.22E+03	4.14E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	76.84	1.01	1.002	3.21E-05	2.57E-06	0	2.6E-06	2.116	7.42E-07	5.56E-07	3.71E-07	1.85E-07	No
Antidepressant	10-hydroxy-amitriptyline	Knik Arm	1.92E-02	1.22E+03	1.57E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	330.56	1.067	1.014	5.54E-06	4.43E-07	0	4.4E-07	--	--	--	--	--	Uncertainty
Antidepressant	Amitriptyline	Knik Arm	7.46E-02	1.22E+03	6.10E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	3275.6	2.78	2.193	5.55E-04	4.44E-05	0	4.4E-05	0.28	9.70E-05	7.27E-05	4.85E-05	2.42E-05	No
Antidiabetic drug	Glipizide	Knik Arm	1.07E-02	1.22E+03	8.75E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	33.828	1	1	2.96E-07	2.37E-08	0	2.4E-08	--	--	--	--	--	Uncertainty
Antidiabetic drug	Glyburide	Knik Arm	1.85E-02	1.22E+03	1.51E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	2689.2	2.452	1.871	9.97E-05	7.98E-06	0	8.0E-06	13	3.75E-07	2.81E-07	1.88E-07	9.38E-08	No
Antidiabetic drug	Metformin	Knik Arm	8.93E+01	1.22E+03	7.30E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	9.24E-04	7.39E-05	0	7.4E-05	0.92	4.91E-05	3.68E-05	2.45E-05	1.23E-05	No
Antifungal agent	Miconazole	Knik Arm	5.62E-02	1.22E+03	4.60E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	24768	12.691	21.677	1.44E-02	1.16E-03	0	1.2E-03	2.076	3.40E-04	2.55E-04	1.70E-04	8.50E-05	No
Antihistamine	Diphenhydramine	Knik Arm	1.68E+00	1.22E+03	1.37E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	267.04	1.053	1.012	3.86E-04	3.09E-05	0	3.1E-05	2	9.44E-06	7.08E-06	4.72E-06	2.36E-06	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4										
Antihistamine	Promethazine	Knik Arm	3.35E-02	1.22E+03	2.74E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	2771.2	2.452	1.871	1.86E-04	1.49E-05	0	1.5E-05	0.22	4.14E-05	3.10E-05	2.07E-05	1.03E-05	No
Antihypertensive	Diltiazem	Knik Arm	4.06E-01	1.22E+03	3.32E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	112.32	1.01	1.002	3.77E-05	3.01E-06	0	3.0E-06	2.96	6.22E-07	4.66E-07	3.11E-07	1.55E-07	No
Antihypertensive	Valsartan	Knik Arm	1.58E+01	1.22E+03	1.29E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	400	1.128	1.033	5.83E-03	4.66E-04	0	4.7E-04	--	--	--	--	--	Uncertainty
Antihypertensive	Verapamil	Knik Arm	5.12E-02	1.22E+03	4.19E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	588.4	1.161	1.042	2.86E-05	2.29E-06	0	2.3E-06	0.456	3.07E-06	2.30E-06	1.53E-06	7.66E-07	No
Antilipemic	Gemfibrozil	Knik Arm	1.33E+00	1.22E+03	1.09E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	2.452	1.871	3.37E-05	2.70E-06	0	2.7E-06	12.648	1.30E-07	9.78E-08	6.52E-08	3.26E-08	No
Antimicrobial, disinfectant	Triclocarban	Knik Arm	4.89E-03	1.22E+03	4.00E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	3186	2.78	2.193	3.54E-05	2.83E-06	0	2.8E-06	138.4	1.25E-08	9.38E-09	6.25E-09	3.13E-09	No
Antimicrobial, disinfectant	Triclosan	Knik Arm	4.31E+00	1.22E+03	3.52E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	2568.8	2.452	1.871	2.22E-02	1.78E-03	0	1.8E-03	6	1.81E-04	1.36E-04	9.04E-05	4.52E-05	No
Antipyretic, analgesic	Acetaminophen	Knik Arm	1.22E+02	1.22E+03	9.98E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.26E-03	1.01E-04	0	1.0E-04	66.66	9.25E-07	6.94E-07	4.63E-07	2.31E-07	No
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	Knik Arm	5.78E+01	1.22E+03	4.73E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	5.98E-04	4.78E-05	0	4.8E-05	--	--	--	--	--	Uncertainty
Betablocker	Atenolol	Knik Arm	1.88E+00	1.22E+03	1.54E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.94E-05	1.56E-06	0	1.6E-06	8	1.19E-07	8.91E-08	5.94E-08	2.97E-08	No
Betablocker	Metoprolol	Knik Arm	4.89E-01	1.22E+03	4.00E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	17.944	1	1	7.17E-06	5.74E-07	0	5.7E-07	4.632	7.57E-08	5.68E-08	3.79E-08	1.89E-08	No
Betablocker	Propranolol	Knik Arm	7.48E-02	1.22E+03	6.12E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	203.96	1.083	1.019	1.35E-05	1.08E-06	0	1.1E-06	1.28	5.16E-07	3.87E-07	2.58E-07	1.29E-07	No
BloodThinner	Warfarin	Knik Arm	4.03E-03	1.22E+03	3.30E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	112.32	1.01	1.002	3.74E-07	2.99E-08	0	3.0E-08	0.0064	2.85E-06	2.14E-06	1.43E-06	7.14E-07	No
ChannelBlocker	Amlodipine	Knik Arm	2.48E-02	1.22E+03	2.03E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	177.2	1.028	1.007	3.69E-06	2.96E-07	0	3.0E-07	2	9.03E-08	6.77E-08	4.51E-08	2.26E-08	No
ChannelBlocker	Dehydronifedipine	Knik Arm	1.40E-03	1.22E+03	1.14E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	222.96	1.042	1.009	2.66E-07	2.13E-08	0	2.1E-08	--	--	--	--	--	Uncertainty
ChannelBlocker	Desmethyldiltiazem	Knik Arm	8.36E-02	1.22E+03	6.84E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	112.32	1.01	1.002	7.75E-06	6.20E-07	0	6.2E-07	--	--	--	--	--	Uncertainty
ChannelBlocker	Norverapamil	Knik Arm	1.89E-02	1.22E+03	1.55E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1970.4	1.95	1.459	5.94E-05	4.75E-06	0	4.8E-06	0.032	9.07E-05	6.80E-05	4.53E-05	2.27E-05	No
Cocaine metabolite	Benzoylecgonine	Knik Arm	1.96E+00	1.22E+03	1.60E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	2.03E-05	1.62E-06	0	1.6E-06	0.3804	2.60E-06	1.95E-06	1.30E-06	6.51E-07	No
Contraceptive	Norgestrel	Knik Arm	8.18E-02	1.22E+03	6.69E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	367.32	1.083	1.019	2.66E-05	2.13E-06	0	2.1E-06	20.04	6.49E-08	4.87E-08	3.24E-08	1.62E-08	No
Corticosteroid	Hydrocortisone	Knik Arm	7.82E-01	1.22E+03	6.39E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	21.444	1	1	1.37E-05	1.10E-06	0	1.1E-06	0.6	1.12E-06	8.38E-07	5.59E-07	2.79E-07	No
Depressant	Alprazolam	Knik Arm	3.23E-03	1.22E+03	2.64E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	46.56	1.005	1	1.24E-07	9.89E-09	0	9.9E-09	2.16	2.80E-09	2.10E-09	1.40E-09	6.99E-10	No
Depressant	Diazepam	Knik Arm	8.27E-04	1.22E+03	6.76E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	134.8	1.028	1.007	9.37E-08	7.50E-09	0	7.5E-09	1.112	4.12E-09	3.09E-09	2.06E-09	1.03E-09	No
Diuretic	Furosemide	Knik Arm	2.08E-01	1.22E+03	1.70E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1.005	1	2.16E-06	1.73E-07	0	1.7E-07	10.4	1.02E-08	7.62E-09	5.08E-09	2.54E-09	No
Diuretic	Hydrochlorothiazide	Knik Arm	1.07E+00	1.22E+03	8.75E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.11E-05	8.85E-07	0	8.9E-07	12.32	4.39E-08	3.29E-08	2.20E-08	1.10E-08	No
Diuretic	Triamterene	Knik Arm	9.41E-02	1.22E+03	7.69E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	9.73E-07	7.79E-08	0	7.8E-08	1.6	2.97E-08	2.23E-08	1.49E-08	7.43E-09	No
Fungicide and parasiticide	Thiabendazole	Knik Arm	3.06E-02	1.22E+03	2.50E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	79.2	1.01	1.002	2.00E-06	1.60E-07	0	1.6E-07	5.2	1.88E-08	1.41E-08	9.41E-09	4.70E-09	No
Glycoside	Digoxin	Knik Arm	7.01E-02	1.22E+03	5.73E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.6	1	1	7.22E-07	5.78E-08	0	5.8E-08	0.07112	4.96E-07	3.72E-07	2.48E-07	1.24E-07	No
Lincosamide antibiotic	Lincomycin	Knik Arm	4.35E-02	1.22E+03	3.56E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	4.50E-07	3.60E-08	0	3.6E-08	3.132	7.02E-09	5.27E-09	3.51E-09	1.76E-09	No
Macrolide antibiotic	Azithromycin	Knik Arm	3.41E-01	1.22E+03	2.79E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	834.4	1.253	1.072	2.92E-04	2.33E-05	0	2.3E-05	12	1.19E-06	8.91E-07	5.94E-07	2.97E-07	No
Macrolide antibiotic	Clarithromycin	Knik Arm	1.65E-01	1.22E+03	1.35E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	225.96	1.042	1.009	3.18E-05	2.54E-06	0	2.5E-06	5.08	3.06E-07	2.29E-07	1.53E-07	7.64E-08	No
Macrolide antibiotic	Erythromycin-H2O	Knik Arm	1.68E-01	1.22E+03	1.37E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	194.12	1.034	1.007	2.76E-05	2.21E-06	0	2.2E-06	10.32	1.31E-07	9.79E-08	6.53E-08	3.26E-08	No
Macrolide antibiotic	Roxithromycin	Knik Arm	9.41E-04	1.22E+03	7.69E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	121.36	1.028	1.007	9.60E-08	7.68E-09	0	7.7E-09	0.8	5.86E-09	4.40E-09	2.93E-09	1.47E-09	No
Macrolide antibiotic	Tylosin	Knik Arm	1.43E-03	1.22E+03	1.17E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	22.108	1	1	2.58E-08	2.07E-09	0	2.1E-09	3.2	3.95E-10	2.96E-10	1.97E-10	9.87E-11	No
Nicotinemetabolite	Cotinine	Knik Arm	2.80E+00	1.22E+03	2.29E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	2.90E-05	2.32E-06	0	2.3E-06	6.416	2.21E-07	1.65E-07	1.10E-07	5.52E-08	No
Non-steroidalanti-inflammatory dr	Naproxen	Knik Arm	1.24E+01	1.22E+03	1.01E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1.042	1.009	1.34E-04	1.07E-05	0	1.1E-05	4.936	1.32E-06	9.92E-07	6.62E-07	3.31E-07	No
Oil & Grease	Oil and Grease, Total (HEM)	Knik Arm	4.27E+04	1.22E+03	3.49E+01	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	0	0	0	0.00E+00	0.00E+00	0	0.0E+00	--	--	--	--	--	Uncertainty
Opiate	Codeine	Knik Arm	1.52E-01	1.22E+03	1.24E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	11.328	1	1	1.41E-06	1.13E-07	0	1.1E-07	1.708	4.03E-08	3.02E-08	2.01E-08	1.01E-08	No
Opiate	Hydrocodone	Knik Arm	6.87E-02	1.22E+03	5.62E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	49.8	1.005	1	2.81E-06	2.25E-07	0	2.2E-07	1.5	9.16E-08	6.87E-08	4.58E-08	2.29E-08	No
Opiate	Oxycodone	Knik Arm	1.60E-01	1.22E+03	1.31E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.65E-06	1.32E-07	0	1.3E-07	1.28	6.32E-08	4.74E-08	3.16E-08	1.58E-08	No
Opiod	Propoxyphene	Knik Arm	1.02E-02	1.22E+03	8.34E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1064.4	1.38	1.13	1.23E-05	9.80E-07	0	9.8E-07	0.54	1.11E-06	8.32E-07	5.54E-07	2.77E-07	No
PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-2	Knik Arm	2.58E-02	1.22E+03	2.11E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	166.84	1.493	0.226	5.25E-06	4.20E-07	0	4.2E-07	2.22	1.16E-07	8.68E-08	5.78E-08	2.89E-08	No
PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	Knik Arm	5.24E-03	1.22E+03	4.28E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	60560	14.355	26.669	3.72E-03	2.98E-04	0	3.0E-04	0.5	3.64E-04	2.73E-04	1.82E-04	9.10E-05	No
PBDEs	2,2',3,4,4',5,5',6-OcBDE	Knik Arm	1.41E-03	1.22E+03	1.15E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	7728	2.732	0.778	2.43E-05	1.95E-06	0	1.9E-06	0.07	1.70E-05	1.27E-05	8.50E-06	4.25E-06	No
PBDEs	2,2',3,4,4',5',6-HpBDE	Knik Arm	6.87E-04	1.22E+03	5.62E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	3393.2	1.493	0.226	2.85E-06	2.28E-07	0	2.3E-07	0.07	1.99E-06	1.49E-06	9.94E-07	4.97E-07	No
PBDEs	2,2',3,4,4',5'-HxBDE	Knik Arm	4.94E-04	1.22E+03	4.04E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	9264	3.296	1.146	1.23E-05	9.87E-07	0	9.9E-07	0.07	8.61E-06	6.46E-06	4.31E-06	2.15E-06	No
PBDEs	2,2',3,4,4',6'-HxBDE	Knik Arm	1.54E-04	1.22E+03	1.26E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	9264	3.296	1.146	3.84E-06	3.08E-07	0	3.1E-07	0.07	2.68E-06	2.01E-06	1.34E-06	6.71E-07	No
PBDEs	2,2',3,4,4'-PeBDE	Knik Arm	1.82E-03	1.22E+03	1.49E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	25280	10.914	14.388	4.11E-04	3.28E-05	0	3.3E-05	0.07	2.87E-04	2.15E-04	1.43E-04	7.17E-05	No
PBDEs	2,2',4,4',5,5'-HxBDE	Knik Arm	3.60E-03	1.22E+03	2.94E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	9264	3.296	1.146	8.99E-05	7.19E-06	0	7.2E-06	0.07	6.28E-05	4.71E-05	3.14E-05	1.57E-05	No
PBDEs	2,2',4,4',5,6'-HxBDE	Knik Arm	3.05E-03	1.22E+03	2.49E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	9264	3.296	1.146	7.61E-05	6.09E-06	0	6.1E-06	0.07	5.32E-05	3.99E-05	2.66E-05	1.33E-05	No
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	Knik Arm	4.06E-02	1.22E+03	3.32E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	60560	14.355	26.669	2.89E-02	2.31E-03	0	2.3E-03	0.058	2.43E-02	1.82E-02	1.22E-02	6.08E-03	No
PBDEs	2,2',4,4',6,6'-HxBDE	Knik Arm	2.13E-04	1.22E+03	1.74E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	9264	3.296	1.146	5.32E-06	4.25E-07	0	4.3E-07	0.07	3.71E-06	2.79E-06	1.86E-06	9.28E-07	No
PBDEs	2,2',4,4',6-PeBDE	Knik Arm	8.11E-03	1.22E+03	6.63E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	25280	10.914	14.388	1.83E-03	1.46E-04	0	1.5E-04	0.07	1.28E-03	9.58E-04	6.39E-04	3.19E-04	No
PBDEs	2,2',4,4'-TeBDE (BDE-47)	Knik Arm	4.32E-02	1.22E+03	3.53E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	54400	14.355	26.669	2.76E-02	2.21E-03	0	2.2E-03	0.07	1.93E-02	1.44E-02	9.63E-03	4.82E-03	No
PBDEs	2,2',4,5'-TeBDE	Knik Arm	1.56E-03	1.22E+03	1.28E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	54400	14.355	26.669	9.96E-04	7.97E-05	0	8.0E-05	0.07	6.96E-04	5.22E-04	3.48E-04	1.74E-04	No
PBDEs	2,2',4,6'-TeBDE	Knik Arm	2.40E-04	1.22E+03	1.96E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	54400	14.355	26.669	1.53E-04	1.23E-05	0	1.2E-05	0.07	1.07E-04	8.03E-05	5.35E-05	2.68E-05	No
PBDEs	2,2',4-TriBDE	Knik Arm	1.11E-03	1.22E+03	9.08E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	14076	9.716	13.964	1.24E-04	9.93E-06	0	9.9E-06	0.07	8.67E-05	6.50E-05	4.33E-05	2.17E-05	No
PBDEs	2,3',4,4',6-PeBDE	Knik Arm	2.02E-04	1.22E+03	1.65E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	25280	10.914	14.388	4.56E-05	3.65E-06	0	3.6E-06	0.07	3.18E-05	2.39E-05	1.59E-05	7.96E-06	No
PBDEs	2,3',4,4'-TeBDE	Knik Arm	1.50E-03	1.22E+03	1.23E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	54400	14.355	26.669	9.58E-04	7.66E-05	0	7.7E-05	0.07	6.69E-04	5.02E-04	3.34E-04	1.67E-04	No
PBDEs	2,3',4,6-TeBDE	Knik Arm	5.58E-04	1.22E+03	4.56E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	54400	14.355	26.669	3.56E-04	2.85E-05	0	2.9E-05	0.07	2.49E-04	1.87E-04	1.24E-04	6.22E-05	No
PBDEs	2,4,4'-TriBDE	Knik Arm	1.35E-03	1.22E+03	1.10E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	14076	9.716	13.964	1.51E-04	1.21E-05	0	1.2E-05	0.07	1.05E-04	7.91E-05	5.27E-05	2.64E-05	No
Pesticides	2,4'-DDD	Knik Arm	1.07E-03	1.22E+03	8.75E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	13944	9.716	13.964	1.19E-04	9.48E-06	0	9.5E-06	0.147	3.94E-05	2.96E-05	1.97E-05	9.85E-06	No
Pesticides	4,4'-DDD	Knik Arm	2.10E-02	1.22E+03	1.72E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	17420	10.556	15.996	3.16E-03	2.53E-04	0	2.5E-04	0.147	1.05E-03	7.87E-04	5.25E-04	2.62E-04	No
Pesticides	4,4'-DDE	Knik Arm	4.70E-03	1.22E+03	3.84E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	36672	13.662	24.604	1.93E-03	1.54E-04	0	1.5E-04	0.147	6.40E-04	4.80E-04	3.20E-04	1.60E-04	No
Pesticides	4,4'-DDT	Knik Arm	1.86E-04	1.22E+03	1.52E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	67360	14.388	26.669	1.47E-04	1.18E-05	0	1.2E-05	0.147	4.90E-05	3.68E-05	2.45E-05	1.23E-05	No
Pesticides	Aldrin	Knik Arm	9.70E-03	1.22E+03	7.93E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	36120	13.662	24.604	3.91E-03	3.13E-04	0	3.1E-04	0.2	9.57E-04	7.17E-04	4.78E-04	2.39E-04	No
Pesticides	Chlordane, alpha (cis)	Knik Arm	1.42E-04	1.22E+03	1.16E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	23604	12.064	19.907	3.31E-05	2.65E-06	0	2.6E-06	0.15	1.08E-05	8.08E-06	5.39E-06	2.69E-06	No
Pesticides	Chlorpyriphos	Knik Arm	9.72E-04	1.22E+03	7.95E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	3480.8	3.181	2.612	8.80E-06	7.04E-07	0	7.0E-07	0.1	4.30E-06	3.23E-06	2.15E-06	1.08E-06	No
Pesticides	Chlorpyriphos-Methyl	Knik Arm	2.11E-04	1.22E+03	1.73E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1296.4	1.491	1.178	3.33E-07	2.67E-08	0	2.7E-08	0.1	1.63E-07	1.22E-07	8.15E-08	4.08E-08	No
Pesticides	Cypermethrin	Knik Arm	4.05E-03	1.22E+03	3.31E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	3881.2	14.388	26.669	1.85E-04	1.48E-05	0	1.5E-05	0.2	4.52E-05	3.39E-05	2.26E-05	1.13E-05	No
Pesticides	DEET	Knik Arm	6.36E+00	1.22E+03	5.20E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	51	1.005	1	2.67E-04	2.13E-05	0	2.1E-05	1	1.30E-05	9.77E-06	6.51E-06	3.26E-06	No
Pesticides	Demeton-O,S	Knik Arm	3.80E-02	1.22E+03	3.11E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	38.352	1	1	1.19E-06	9.53E-08	0	9.5E-08	0.008	7.28E-06	5.46E-06	3.64E-06	1.82E-06	No
Pesticides	Dieldrin	Knik Arm	1.40E-02	1.22E+03	1.14E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	5012	4.188	3.873	2.40E-04	1.92E-05	0	1.9E-05	0.015	7.83E-04	5.87E-04	3.91E-04	1.96E-04	No
Pesticides	Endosulfan Sulfate	Knik Arm	2.20E-02	1.22E+03	1.80E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	482.8	1.128	1.033	9.80E-06	7.84E-07	0	7.8E-07	0.058	8.26E-06	6.19E-06	4.13E-06	2.06E-06	No
Pesticides	Endrin	Knik Arm	6.20E-05	1.22E+03	5.07E-08	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	5012	4.188	3.873	1.06E-06	8.51E-08	0	8.5E-08	0.184	2.83E-07	2.12E-07	1.41E-07	7.07E-08	No
Pesticides	Endrin Ketone	Knik Arm	9.60E-03	1.22E+03	7.85E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	3623.2	3.181	2.612	9.05E-05	7.24E-06	0	7.2E-06	0.184	2.40E-05	1.80E-05	1.20E-05	6.01E-06	No
Pesticides	HCH, alpha	Knik Arm	6.60E-05	1.22E+03	5.40E-08	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1001.6	1.315	1.096	7.11E-08	5.69E-09	0	5.7E-09	87	3.99E-11	3.00E-11	2.00E-11	9.98E-12	No
Pesticides	HCH, beta	Knik Arm	1.09E-04	1.22E+03	8.91E-08	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1001.6	1.315	1.096	1.17E-07	9.39E-09	0	9.4E-09	0.4	1.43E-08	1.08E-08	7.17E-09	3.59E-09	No
Pesticides	HCH, gamma	Knik Arm	6.96E-04	1.22E+03	5.69E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1001.6	1.315	1.096	7.50E-07	6.00E-08	0	6.0E-08	0.014	2.62E-06	1.96E-06	1.31E-06	6.54E-07	No
Pesticides	Heptachlor	Knik Arm	1.40E-02	1.22E+03	1.14E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	7552	6.266	7.079	5.42E-04	4.33E-05	0	4.3E-05	0.2	1.32E-04	9.93E-05	6.62E-05	3.31E-05	No
Pesticides	Hexachlorobenzene	Knik Arm	5.17E-04	1.22E+03	4.23E-07	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	11212	7.962	10.209	3.77E-05	3.02E-06	0	3.0E-06	7.1	2.60E-07	1.95E-07	1.30E-07	6.49E-08	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4										
Pesticides	Malathion	Knik Arm	5.20E-01	1.22E+03	4.25E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	67	1.01	1.002	2.88E-05	2.30E-06	0	2.3E-06	0.046	3.06E-05	2.29E-05	1.53E-05	7.64E-06	No
Pesticides	Methoxychlor	Knik Arm	2.90E-03	1.22E+03	2.37E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	4176	3.643	3.162	3.61E-05	2.89E-06	0	2.9E-06	1.002	1.76E-06	1.32E-06	8.80E-07	4.40E-07	No
Pesticides	Permethrin	Knik Arm	4.23E-02	1.22E+03	3.46E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1989.2	13.662	24.604	9.40E-04	7.52E-05	0	7.5E-05	5	9.19E-06	6.89E-06	4.59E-06	2.30E-06	No
PFAS	5:3 FTCA	Knik Arm	5.92E-02	1.22E+03	4.84E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1.766	1.334	1.08E-06	8.65E-08	0	8.6E-08	5	1.06E-08	7.93E-09	5.28E-09	2.64E-09	No
PFAS	PFBA	Knik Arm	1.49E-02	1.22E+03	1.22E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1.005	1	1.55E-07	1.24E-08	0	1.2E-08	35	2.16E-10	1.62E-10	1.08E-10	5.41E-11	No
PFAS	PFHpA	Knik Arm	8.47E-03	1.22E+03	6.93E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1.315	1.096	1.15E-07	9.21E-09	0	9.2E-09	--	--	--	--	--	Uncertainty
PFAS	PFHxA	Knik Arm	2.55E-02	1.22E+03	2.09E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1.083	1.019	2.86E-07	2.28E-08	0	2.3E-08	20	6.98E-10	5.24E-10	3.49E-10	1.75E-10	No
PFAS	PFHxS	Knik Arm	3.96E-02	1.22E+03	3.24E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1.042	1.009	4.27E-07	3.41E-08	0	3.4E-08	5.72	3.65E-09	2.73E-09	1.82E-09	9.12E-10	No
PFAS	PFNA	Knik Arm	5.14E-03	1.22E+03	4.20E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	40	6.266	7.079	1.05E-06	8.43E-08	0	8.4E-08	0.166	3.10E-07	2.33E-07	1.55E-07	7.75E-08	No
PFAS	PFOA	Knik Arm	1.85E-02	1.22E+03	1.51E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	2.452	1.871	4.69E-07	3.75E-08	0	3.8E-08	1.75	1.31E-08	9.83E-09	6.55E-09	3.28E-09	No
PFAS	PFOS	Knik Arm	6.53E-02	1.22E+03	5.34E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1.766	1.334	1.19E-06	9.54E-08	0	9.5E-08	0.12	4.86E-07	3.64E-07	2.43E-07	1.21E-07	No
PFAS	PFPeA	Knik Arm	2.03E-02	1.22E+03	1.66E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1.028	1.007	2.16E-07	1.73E-08	0	1.7E-08	--	--	--	--	--	Uncertainty
PFAS	PFPeS	Knik Arm	3.84E-03	1.22E+03	3.14E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1.01	1.002	4.01E-08	3.21E-09	0	3.2E-09	--	--	--	--	--	Uncertainty
Plasticizer	Bisphenol A	Knik Arm	1.59E+00	1.22E+03	1.30E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	288.12	1.053	1.012	3.94E-04	3.16E-05	0	3.2E-05	10	1.93E-06	1.45E-06	9.64E-07	4.82E-07	No
Plasticizer	Bisphenol S	Knik Arm	8.88E-01	1.22E+03	7.26E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	22.672	1	1	1.65E-05	1.32E-06	0	1.3E-06	10	8.05E-08	6.03E-08	4.02E-08	2.01E-08	No
Pyrimidine antibiotic	Trimethoprim	Knik Arm	7.11E-01	1.22E+03	5.81E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	7.35E-06	5.88E-07	0	5.9E-07	0.8	4.49E-07	3.37E-07	2.25E-07	1.12E-07	No
Quinoline antibiotic	Ciprofloxacin	Knik Arm	3.72E-01	1.22E+03	3.04E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	3.85E-06	3.08E-07	0	3.1E-07	4	4.70E-08	3.53E-08	2.35E-08	1.18E-08	No
Quinoline antibiotic	Ofloxacin	Knik Arm	4.27E-01	1.22E+03	3.49E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	4.42E-06	3.53E-07	0	3.5E-07	2	1.08E-07	8.09E-08	5.40E-08	2.70E-08	No
Rubber Stabilizing compound	6PPD-Quinone	Knik Arm	5.30E-03	1.22E+03	4.33E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	781.6	1.253	1.072	4.24E-06	3.40E-07	0	3.4E-07	2	1.04E-07	7.78E-08	5.19E-08	2.59E-08	No
Sex hormone	17 beta-Estradiol	Knik Arm	5.52E-03	1.22E+03	4.51E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	822	1.253	1.072	4.65E-06	3.72E-07	0	3.7E-07	0.01	2.27E-05	1.70E-05	1.14E-05	5.68E-06	No
Sex hormone	Estrone	Knik Arm	3.31E-02	1.22E+03	2.71E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	215.88	1.034	1.007	6.04E-06	4.83E-07	0	4.8E-07	--	--	--	--	--	Uncertainty
Sex hormone	Progesterone	Knik Arm	5.66E-02	1.22E+03	4.63E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	664.4	1.202	1.054	3.70E-05	2.96E-06	0	3.0E-06	0.66	2.74E-06	2.05E-06	1.37E-06	6.84E-07	No
Sex hormone	Testosterone	Knik Arm	7.17E-02	1.22E+03	5.86E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	288.12	1.053	1.012	1.78E-05	1.42E-06	0	1.4E-06	1.72	5.05E-07	3.79E-07	2.53E-07	1.26E-07	No
SSRI Antidepressant	Fluoxetine	Knik Arm	5.20E-02	1.22E+03	4.25E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	616	1.161	1.042	3.04E-05	2.43E-06	0	2.4E-06	1.136	1.31E-06	9.81E-07	6.54E-07	3.27E-07	No
SSRI Antidepressant	Norfluoxetine	Knik Arm	2.73E-02	1.22E+03	2.23E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1068	1.38	1.13	3.29E-05	2.63E-06	0	2.6E-06	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Paroxetine	Knik Arm	1.88E-02	1.22E+03	1.54E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	754.4	1.253	1.072	1.45E-05	1.16E-06	0	1.2E-06	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Sertraline	Knik Arm	1.08E-01	1.22E+03	8.83E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	5716	4.803	4.742	2.42E-03	1.94E-04	0	1.9E-04	--	--	--	--	--	Uncertainty
Statin	Atorvastatin	Knik Arm	2.20E-01	1.22E+03	1.80E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	224.92	13.228	23.281	5.35E-04	4.28E-05	0	4.3E-05	20	1.31E-06	9.81E-07	6.54E-07	3.27E-07	No
Steroid	Methylprednisolone	Knik Arm	1.13E-01	1.22E+03	9.24E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	29.396	1	1	2.72E-06	2.17E-07	0	2.2E-07	8	1.66E-08	1.24E-08	8.30E-09	4.15E-09	No
Steroid	Prednisolone	Knik Arm	9.31E-03	1.22E+03	7.61E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	21.772	1	1	1.66E-07	1.33E-08	0	1.3E-08	6.72	1.21E-09	9.04E-10	6.03E-10	3.01E-10	No
Steroidal Estrogen	Equilenin	Knik Arm	1.34E-02	1.22E+03	1.10E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	726.4	1.202	1.054	9.57E-06	7.65E-07	0	7.7E-07	--	--	--	--	--	Uncertainty
Stimulant	Amphetamine	Knik Arm	5.39E-01	1.22E+03	4.41E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	26.936	1	1	1.19E-05	9.50E-07	0	9.5E-07	0.12	4.84E-06	3.63E-06	2.42E-06	1.21E-06	No
Stimulant	Caffeine	Knik Arm	1.05E+02	1.22E+03	8.59E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.09E-03	8.69E-05	0	8.7E-05	0.508	1.04E-04	7.84E-05	5.22E-05	2.61E-05	No
Stimulant	Cocaine	Knik Arm	7.68E-01	1.22E+03	6.28E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	61.16	1.01	1.002	3.88E-05	3.10E-06	0	3.1E-06	0.396	4.79E-06	3.59E-06	2.39E-06	1.20E-06	No
Streoid	Prednisone	Knik Arm	4.04E-01	1.22E+03	3.30E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	17.076	1	1	5.64E-06	4.51E-07	0	4.5E-07	--	--	--	--	--	Uncertainty
Sulfonamide antibiotic	Sulfadiazine	Knik Arm	1.46E-03	1.22E+03	1.19E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.51E-08	1.21E-09	0	1.2E-09	6	1.23E-10	9.23E-11	6.15E-11	3.08E-11	No
Sulfonamide antibiotic	Sulfamethizole	Knik Arm	5.11E-03	1.22E+03	4.18E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	5.28E-08	4.23E-09	0	4.2E-09	14	1.85E-10	1.38E-10	9.23E-11	4.61E-11	No
Sulfonamide antibiotic	Sulfamethoxazole	Knik Arm	1.08E+00	1.22E+03	8.83E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.12E-05	8.94E-07	0	8.9E-07	9.2	5.93E-08	4.45E-08	2.97E-08	1.48E-08	No
Sulfonamide antibiotic	Sulfanilamide	Knik Arm	3.48E-02	1.22E+03	2.85E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	3.60E-07	2.88E-08	0	2.9E-08	12	1.47E-09	1.10E-09	7.33E-10	3.66E-10	No
SVOCs/PAHs	1,2-Diphenylhydrazine	Knik Arm	2.50E+00	1.22E+03	2.04E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	161.76	1.028	1.007	3.40E-04	2.72E-05	0	2.7E-05	--	--	--	--	--	Uncertainty
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	Knik Arm	1.00E-01	1.22E+03	8.18E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	2775.2	2.452	1.871	5.56E-04	4.45E-05	0	4.5E-05	65.6	4.15E-07	3.11E-07	2.07E-07	1.04E-07	No
SVOCs/PAHs	1-Methyldibenzothiophene	Knik Arm	5.00E-02	1.22E+03	4.09E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	2390	2.175	1.633	2.13E-04	1.70E-05	0	1.7E-05	65.6	1.58E-07	1.19E-07	7.92E-08	3.96E-08	No
SVOCs/PAHs	1-Methylfluorene	Knik Arm	5.00E-02	1.22E+03	4.09E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	3534	3.181	2.612	4.60E-04	3.68E-05	0	3.7E-05	65.6	3.42E-07	2.57E-07	1.71E-07	8.56E-08	No
SVOCs/PAHs	1-Methylnaphthalene	Knik Arm	4.27E-01	1.22E+03	3.49E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	664.4	1.202	1.054	2.79E-04	2.23E-05	0	2.2E-05	0.94	1.45E-05	1.09E-05	7.25E-06	3.62E-06	No
SVOCs/PAHs	1-Methylphenanthrene	Knik Arm	2.85E-02	1.22E+03	2.33E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	19132	3.643	3.162	1.62E-03	1.30E-04	0	1.3E-04	65.6	1.21E-06	9.08E-07	6.05E-07	3.03E-07	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Knik Arm	1.20E+00	1.22E+03	9.81E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	505.6	1.128	1.033	5.60E-04	4.48E-05	0	4.5E-05	3	9.12E-06	6.84E-06	4.56E-06	2.28E-06	No
SVOCs/PAHs	2,6-Dimethylnaphthalene	Knik Arm	3.44E-01	1.22E+03	2.81E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1296.4	1.491	1.178	5.44E-04	4.35E-05	0	4.3E-05	65.6	4.05E-07	3.04E-07	2.03E-07	1.01E-07	No
SVOCs/PAHs	2-Methylanthracene	Knik Arm	6.36E-02	1.22E+03	5.20E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	3698.8	3.181	2.612	6.12E-04	4.89E-05	0	4.9E-05	65.6	4.56E-07	3.42E-07	2.28E-07	1.14E-07	No
SVOCs/PAHs	2-Methylfluoranthene	Knik Arm	1.74E-02	1.22E+03	1.42E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	7672	6.266	7.079	6.84E-04	5.47E-05	0	5.5E-05	65.6	5.10E-07	3.82E-07	2.55E-07	1.27E-07	No
SVOCs/PAHs	2-Methylnaphthalene	Knik Arm	5.41E-01	1.22E+03	4.42E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	654.4	1.202	1.054	3.48E-04	2.78E-05	0	2.8E-05	65.6	2.59E-07	1.94E-07	1.30E-07	6.48E-08	No
SVOCs/PAHs	2-Methylphenanthrene	Knik Arm	6.47E-02	1.22E+03	5.29E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	13696	2.78	2.193	2.01E-03	1.61E-04	0	1.6E-04	65.6	1.50E-06	1.13E-06	7.50E-07	3.75E-07	No
SVOCs/PAHs	3,6-Dimethylphenanthrene	Knik Arm	1.89E-02	1.22E+03	1.55E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	33036	5.502	5.821	2.81E-03	2.25E-04	0	2.2E-04	65.6	2.09E-06	1.57E-06	1.05E-06	5.23E-07	No
SVOCs/PAHs	3-Methylphenanthrene	Knik Arm	5.79E-02	1.22E+03	4.73E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	13696	2.78	2.193	1.80E-03	1.44E-04	0	1.4E-04	65.6	1.34E-06	1.01E-06	6.72E-07	3.36E-07	No
SVOCs/PAHs	4-Methyldibenzothiophene	Knik Arm	2.29E-02	1.22E+03	1.87E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	2390	2.175	1.633	9.73E-05	7.79E-06	0	7.8E-06	65.6	7.25E-08	5.44E-08	3.63E-08	1.81E-08	No
SVOCs/PAHs	Acenaphthene	Knik Arm	8.21E-02	1.22E+03	6.71E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	716.8	1.202	1.054	5.78E-05	4.63E-06	0	4.6E-06	65.6	4.31E-08	3.23E-08	2.15E-08	1.08E-08	No
SVOCs/PAHs	Acenaphthylene	Knik Arm	1.25E-02	1.22E+03	1.02E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	739.2	1.202	1.054	9.08E-06	7.27E-07	0	7.3E-07	65.6	6.77E-09	5.07E-09	3.38E-09	1.69E-09	No
SVOCs/PAHs	Anthracene	Knik Arm	5.53E-02	1.22E+03	4.52E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1604	1.766	1.334	1.28E-04	1.02E-05	0	1.0E-05	65.6	9.54E-08	7.16E-08	4.77E-08	2.39E-08	No
SVOCs/PAHs	Benz(a)anthracene	Knik Arm	2.50E-01	1.22E+03	2.04E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	11736	8.841	12.05	2.12E-02	1.70E-03	0	1.7E-03	0.62	1.67E-03	1.25E-03	8.36E-04	4.18E-04	No
SVOCs/PAHs	Benzo(a)fluoranthene	Knik Arm	1.51E-02	1.22E+03	1.23E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12096	8.841	12.05	1.32E-03	1.06E-04	0	1.1E-04	0.615	1.05E-04	7.87E-05	5.25E-05	2.62E-05	No
SVOCs/PAHs	Benzo(a)pyrene	Knik Arm	5.63E-02	1.22E+03	4.60E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	20588	11.337	17.783	1.07E-02	8.60E-04	0	8.6E-04	0.62	8.47E-04	6.35E-04	4.24E-04	2.12E-04	No
SVOCs/PAHs	Benzo(b)fluoranthene	Knik Arm	4.90E-02	1.22E+03	4.01E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12096	8.841	12.05	4.28E-03	3.43E-04	0	3.4E-04	0.62	3.38E-04	2.53E-04	1.69E-04	8.44E-05	No
SVOCs/PAHs	Benzo(b)fluorene	Knik Arm	4.06E-02	1.22E+03	3.32E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	11916	8.841	12.05	3.50E-03	2.80E-04	0	2.8E-04	0.615	2.78E-04	2.08E-04	1.39E-04	6.95E-05	No
SVOCs/PAHs	Benzo(e)pyrene	Knik Arm	5.23E-02	1.22E+03	4.28E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	32976	13.228	23.281	1.87E-02	1.49E-03	0	1.5E-03	0.615	1.48E-03	1.11E-03	7.41E-04	3.71E-04	No
SVOCs/PAHs	Benzo(g,h,i)perylene	Knik Arm	8.33E-02	1.22E+03	6.81E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	44000	13.98	25.645	4.19E-02	3.35E-03	0	3.4E-03	14.4	1.42E-04	1.07E-04	7.11E-05	3.56E-05	No
SVOCs/PAHs	Benzo(k,j)fluoranthene	Knik Arm	3.34E-02	1.22E+03	2.73E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	19972	11.337	17.783	6.18E-03	4.95E-04	0	4.9E-04	0.615	4.91E-04	3.69E-04	2.46E-04	1.23E-04	No
SVOCs/PAHs	Benzothiophene	Knik Arm	1.44E-02	1.22E+03	1.18E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	212.64	1.034	1.007	2.59E-06	2.07E-07	0	2.1E-07	0.615	2.06E-07	1.54E-07	1.03E-07	5.14E-08	No
SVOCs/PAHs	Biphenyl	Knik Arm	1.02E-01	1.22E+03	8.34E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	822	1.253	1.072	8.59E-05	6.87E-06	0	6.9E-06	0.615	6.83E-06	5.12E-06	3.41E-06	1.71E-06	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Knik Arm	9.50E+01	1.22E+03	7.77E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	6848	11.708	16.749	6.23E+00	4.98E-01	0	5.0E-01	18.3	1.66E-02	1.25E-02	8.32E-03	4.16E-03	No
SVOCs/PAHs	Butyl Benzyl Phthalate	Knik Arm	5.62E+00	1.22E+03	4.60E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	2454.4	2.175	1.633	2.45E-02	1.96E-03	0	2.0E-03	159	7.54E-06	5.66E-06	3.77E-06	1.89E-06	No
SVOCs/PAHs	Carbazole	Knik Arm	2.01E-01	1.22E+03	1.64E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	529.2	1.128	1.033	9.81E-05	7.85E-06	0	7.8E-06	0.615	7.80E-06	5.85E-06	3.90E-06	1.95E-06	No
SVOCs/PAHs	Chrysene/Triphenylene	Knik Arm	6.14E-02	1.22E+03	5.02E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12660	8.841	12.05	5.62E-03	4.50E-04	0	4.5E-04	0.615	4.47E-04	3.35E-04	2.23E-04	1.12E-04	No
SVOCs/PAHs	cis/trans Decalin	Knik Arm	4.84E-01	1.22E+03	3.96E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1091.2	1.38	1.13	5.96E-04	4.77E-05	0	4.8E-05	16.68	1.75E-06	1.31E-06	8.73E-07	4.37E-07	No
SVOCs/PAHs	Dibenzo(a,h)anthracene	Knik Arm	6.68E-03	1.22E+03	5.46E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	38384	13.662	24.604	2.86E-03	2.29E-04	0	2.3E-04	2.66	5.26E-05	3.95E-05	2.63E-05	1.32E-05	No
SVOCs/PAHs	Dibenzofuran	Knik Arm	6.98E-02	1.22E+03	5.71E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	971.6	1.315	1.096	7.29E-05	5.83E-06	0	5.8E-06	0.615	5.80E-06	4.35E-06	2.90E-06	1.45E-06	No
SVOCs/PAHs	Dibenzothiophene	Knik Arm	3.35E-02	1.22E+03	2.74E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1442	1.614	1.242	6.38E-05	5.10E-06	0	5.1E-06	1.04	3.00E-06	2.25E-06	1.50E-06	7.49E-07	No
SVOCs/PAHs	Diethyl Phthalate	Knik Arm	3.70E+00	1.22E+03	3.03E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	73.4	1.01	1.002	2.24E-04	1.79E-05	0	1.8E-05	4600	2.38E-09	1.79E-09	1.19E-09	5.96E-10	No
SVOCs/PAHs	Dimethyl Phthalate	Knik Arm	1.20E-01	1.22E+03	9.81E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	21.124	1	1	2.07E-06	1.66E-07	0	1.7E-07	68	1.49E-09	1.12E-09	7.45E-10	3.72E-10	No
SVOCs/PAHs	Di-n-butyl Phthalate	Knik Arm	8.40E-01	1.22E+03	6.87E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1730.4	1.766	1.334	2.10E-03	1.68E-04	0	1.7E-04	1340	7.66E-08	5.74E-08	3.83E-08	1.91E-08	No
SVOCs/PAHs	Di-n-octyl Phthalate	Knik Arm	1.89E+01	1.22E+03	1.55E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	3895.6	7.278	6.012	4.38E-01	3.51E-02	0	3.5E-02	36.8	5.82E-04	4.36E-04	2.91E-04	1.45E-04	No
SVOCs/PAHs	Fluoranthene	Knik Arm	3.17E-01	1.22E+03	2.59E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	4716	4.188	3.873	5.12E-03	4.10E-04	0	4.1E-04	125	2.00E-06	1.50E-06	1.00E-06	5.00E-07	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
SVOCs/PAHs	Fluorene	Knik Arm	1.26E-01	1.22E+03	1.03E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	1064.4	1.38	1.13	1.51E-04	1.21E-05	0	1.2E-05	125	5.92E-08	4.44E-08	2.96E-08	1.48E-08	No
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	Knik Arm	4.44E-02	1.22E+03	3.63E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	48720	14.223	26.363	2.52E-02	2.01E-03	0	2.0E-03	7.2	1.71E-04	1.28E-04	8.54E-05	4.27E-05	No
SVOCs/PAHs	Isophorone	Knik Arm	3.80E-01	1.22E+03	3.11E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	24.588	1	1	7.64E-06	6.11E-07	0	6.1E-07	150	2.49E-09	1.87E-09	1.24E-09	6.22E-10	No
SVOCs/PAHs	Naphthalene	Knik Arm	9.80E-01	1.22E+03	8.01E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	279.52	1.053	1.012	2.36E-04	1.89E-05	0	1.9E-05	71	1.62E-07	1.22E-07	8.12E-08	4.06E-08	No
SVOCs/PAHs	Naphthobenzothiophene	Knik Arm	3.37E-02	1.22E+03	2.76E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	4936	4.188	3.873	5.70E-04	4.56E-05	0	4.6E-05	0.615	4.53E-05	3.40E-05	2.26E-05	1.13E-05	No
SVOCs/PAHs	N-Nitrosodimethylamine	Knik Arm	9.60E+00	1.22E+03	7.85E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	9.93E-05	7.94E-06	0	7.9E-06	0.005	9.71E-04	7.28E-04	4.85E-04	2.43E-04	No
SVOCs/PAHs	Pentachlorophenol (PCP)	Knik Arm	6.30E+00	1.22E+03	5.15E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	4440	3.643	3.162	8.33E-02	6.67E-03	0	6.7E-03	8.42	4.84E-04	3.63E-04	2.42E-04	1.21E-04	No
SVOCs/PAHs	Perylene	Knik Arm	3.33E-02	1.22E+03	2.72E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	24708	12.691	21.677	8.54E-03	6.83E-04	0	6.8E-04	0.615	6.79E-04	5.09E-04	3.39E-04	1.70E-04	No
SVOCs/PAHs	Phenanthrene	Knik Arm	9.80E-01	1.22E+03	8.01E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	7460	1.766	1.334	1.06E-02	8.45E-04	0	8.4E-04	65.6	7.87E-06	5.90E-06	3.93E-06	1.97E-06	No
SVOCs/PAHs	Phenol	Knik Arm	5.45E+01	1.22E+03	4.46E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	17.076	1	1	7.61E-04	6.09E-05	0	6.1E-05	60	6.20E-07	4.65E-07	3.10E-07	1.55E-07	No
SVOCs/PAHs	Pyrene	Knik Arm	4.70E-01	1.22E+03	3.84E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	3082.4	2.78	2.193	3.29E-03	2.63E-04	0	2.6E-04	0.615	2.62E-04	1.96E-04	1.31E-04	6.54E-05	No
SVOCs/PAHs	Retene	Knik Arm	1.08E-02	1.22E+03	8.83E-06	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	131400	12.691	21.677	1.47E-02	1.18E-03	0	1.2E-03	65.6	1.10E-05	8.23E-06	5.49E-06	2.74E-06	No
Tetracycline antibiotic	Doxycycline	Knik Arm	1.50E-01	1.22E+03	1.23E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.55E-06	1.24E-07	0	1.2E-07	4.0298	1.88E-08	1.41E-08	9.41E-09	4.70E-09	No
Tetracycline antibiotic	Tetracycline [TC]	Knik Arm	9.79E-02	1.22E+03	8.00E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.01E-06	8.10E-08	0	8.1E-08	6.4	7.73E-09	5.80E-09	3.87E-09	1.93E-09	No
Tranquilizer	Meprobamate	Knik Arm	3.83E-01	1.22E+03	3.13E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	3.96E-06	3.17E-07	0	3.2E-07	3	6.45E-08	4.84E-08	3.23E-08	1.61E-08	No
Urinary steroid	Androsterone	Knik Arm	5.71E-02	1.22E+03	4.67E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	505.6	1.128	1.033	2.66E-05	2.13E-06	0	2.1E-06	200	6.51E-09	4.88E-09	3.25E-09	1.63E-09	No
VOCs	1,1,1-Trichloroethane (TCA)	Knik Arm	7.90E-01	1.22E+03	6.46E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	81.64	1.01	1.002	5.33E-05	4.26E-06	0	4.3E-06	999	2.61E-09	1.95E-09	1.30E-09	6.52E-10	No
VOCs	1,2-Dichloroethane (EDC)	Knik Arm	8.00E-02	1.22E+03	6.54E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	17.604	1	1	1.15E-06	9.21E-08	0	9.2E-08	382	1.47E-10	1.11E-10	7.37E-11	3.68E-11	No
VOCs	1,4-Dichlorobenzene	Knik Arm	8.40E-01	1.22E+03	6.87E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	345.76	1.067	1.014	2.53E-04	2.03E-05	0	2.0E-05	2.5	4.95E-06	3.72E-06	2.48E-06	1.24E-06	No
VOCs	2-Butanone (MEK)	Knik Arm	6.80E+01	1.22E+03	5.56E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	7.03E-04	5.63E-05	0	5.6E-05	1771	1.94E-08	1.46E-08	9.70E-09	4.85E-09	No
VOCs	2-Hexanone	Knik Arm	5.70E+00	1.22E+03	4.66E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	15.12	1	1	7.05E-05	5.64E-06	0	5.6E-06	8.27	4.17E-07	3.12E-07	2.08E-07	1.04E-07	No
VOCs	Acetone	Knik Arm	3.00E+02	1.22E+03	2.45E-01	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	3.10E-03	2.48E-04	0	2.5E-04	20	7.58E-06	5.69E-06	3.79E-06	1.90E-06	No
VOCs	Acrolein	Knik Arm	1.30E+00	1.22E+03	1.06E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.34E-05	1.08E-06	0	1.1E-06	0.05	1.31E-05	9.86E-06	6.57E-06	3.29E-06	No
VOCs	Benzene	Knik Arm	7.80E-01	1.22E+03	6.38E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	47.24	1.005	1	3.03E-05	2.42E-06	0	2.4E-06	26.36	5.61E-08	4.21E-08	2.81E-08	1.40E-08	No
VOCs	Bromodichloromethane	Knik Arm	8.00E-02	1.22E+03	6.54E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	38.784	1.005	1	2.55E-06	2.04E-07	0	2.0E-07	3.58	3.48E-08	2.61E-08	1.74E-08	8.70E-09	No
VOCs	Bromomethane	Knik Arm	9.00E-02	1.22E+03	7.36E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	11.328	1	1	8.34E-07	6.67E-08	0	6.7E-08	0.284	1.43E-07	1.08E-07	7.17E-08	3.59E-08	No
VOCs	Carbon Disulfide	Knik Arm	7.00E-01	1.22E+03	5.72E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	35.404	1	1	2.03E-05	1.62E-06	0	1.6E-06	11	9.00E-08	6.75E-08	4.50E-08	2.25E-08	No
VOCs	Chlorobenzene	Knik Arm	8.00E-02	1.22E+03	6.54E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	138.96	1.028	1.007	9.34E-06	7.48E-07	0	7.5E-07	19	2.40E-08	1.80E-08	1.20E-08	6.01E-09	No
VOCs	Chloroethane	Knik Arm	6.90E-01	1.22E+03	5.64E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	16.316	1	1	9.21E-06	7.36E-07	0	7.4E-07	--	--	--	--	--	Uncertainty
VOCs	Chloroform	Knik Arm	3.95E+00	1.22E+03	3.23E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	37.056	1	1	1.20E-04	9.57E-06	0	9.6E-06	2.58	2.27E-06	1.70E-06	1.13E-06	5.67E-07	No
VOCs	Chloromethane	Knik Arm	1.90E+00	1.22E+03	1.55E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.648	1	1	1.96E-05	1.57E-06	0	1.6E-06	3.2	3.00E-07	2.25E-07	1.50E-07	7.50E-08	No
VOCs	cis-1,2-Dichloroethene	Knik Arm	7.00E-02	1.22E+03	5.72E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	38.784	1.005	1	2.23E-06	1.78E-07	0	1.8E-07	90.4	1.21E-09	9.05E-10	6.03E-10	3.02E-10	No
VOCs	Dichloromethane (Methylene Chlori	Knik Arm	6.85E+00	1.22E+03	5.60E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	12.412	1	1	6.95E-05	5.56E-06	0	5.6E-06	5.85	5.81E-07	4.36E-07	2.90E-07	1.45E-07	No
VOCs	Ethylbenzene	Knik Arm	1.50E+00	1.22E+03	1.23E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	222.56	1.042	1.009	2.84E-04	2.28E-05	0	2.3E-05	97.1	1.43E-07	1.07E-07	7.16E-08	3.58E-08	No
VOCs	m,p-Xylenes	Knik Arm	6.20E+00	1.22E+03	5.07E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	226	1.042	1.009	1.19E-03	9.55E-05	0	9.6E-05	2.1	2.78E-05	2.08E-05	1.39E-05	6.95E-06	No
VOCs	o-Xylene	Knik Arm	2.60E+00	1.22E+03	2.13E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	225.96	1.042	1.009	5.01E-04	4.00E-05	0	4.0E-05	2.1	1.17E-05	8.74E-06	5.83E-06	2.91E-06	No
VOCs	Styrene	Knik Arm	5.50E+00	1.22E+03	4.50E-03	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	164.24	1.028	1.007	7.59E-04	6.07E-05	0	6.1E-05	200	1.86E-07	1.39E-07	9.28E-08	4.64E-08	No
VOCs	Tetrachloroethene (PCE)	Knik Arm	6.00E-01	1.22E+03	4.91E-04	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	325.36	1.067	1.014	1.70E-04	1.36E-05	0	1.4E-05	63	1.32E-07	9.91E-08	6.61E-08	3.30E-08	No
VOCs	Toluene	Knik Arm	1.60E+01	1.22E+03	1.31E-02	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	117.56	1.01	1.002	1.55E-03	1.24E-04	0	1.2E-04	26	2.92E-06	2.19E-06	1.46E-06	7.30E-07	No
VOCs	Trichloroethene (TCE)	Knik Arm	7.00E-02	1.22E+03	5.72E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	73.4	1.01	1.002	4.24E-06	3.39E-07	0	3.4E-07	2.8	7.41E-08	5.56E-08	3.70E-08	1.85E-08	No
VOCs	Vinyl Chloride	Knik Arm	2.00E-02	1.22E+03	1.64E-05	Steller Sea Lion	263	0.08	0	0.6110	1	1	0	model	21.884	1	1	3.58E-07	2.86E-08	0	2.9E-08	0.17	1.03E-07	7.72E-08	5.14E-08	2.57E-08	No
Metals	Antimony	Mid Upper Cook Inlet	9.04E-01	2.19E+03	4.13E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	4	1	1	1.65E-06	4.96E-08	0	5.0E-08	0.059	2.48E-08	1.86E-08	1.24E-08	6.19E-09	No
Metals	Arsenic	Mid Upper Cook Inlet	3.42E+00	2.19E+03	1.56E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	176	1	1	2.75E-04	8.25E-06	0	8.2E-06	1.04	2.34E-07	1.75E-07	1.17E-07	5.85E-08	No
Metals	Beryllium	Mid Upper Cook Inlet	1.80E-02	2.19E+03	8.22E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	76	1	1	6.25E-07	1.87E-08	0	1.9E-08	0.532	1.04E-09	7.80E-10	5.20E-10	2.60E-10	No
Metals	Cadmium	Mid Upper Cook Inlet	3.09E-01	2.19E+03	1.41E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	152	1	1	2.15E-05	6.44E-07	0	6.4E-07	0.77	2.47E-08	1.85E-08	1.23E-08	6.17E-09	No
Metals	Chromium	Mid Upper Cook Inlet	3.46E+00	2.19E+03	1.58E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	64	1	1	1.01E-04	3.03E-06	0	3.0E-06	2.4	3.73E-08	2.80E-08	1.87E-08	9.33E-09	No
Metals	Copper	Mid Upper Cook Inlet	1.15E+02	2.19E+03	5.25E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	144	1	1	7.57E-03	2.27E-04	0	2.3E-04	5.6	1.20E-06	8.97E-07	5.98E-07	2.99E-07	No
Metals	Dissolved Antimony	Mid Upper Cook Inlet	8.06E-01	2.19E+03	3.68E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	4	1	1	1.47E-06	4.42E-08	0	4.4E-08	0.059	2.21E-08	1.66E-08	1.10E-08	5.52E-09	No
Metals	Dissolved Arsenic	Mid Upper Cook Inlet	2.78E+00	2.19E+03	1.27E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	176	1	1	2.24E-04	6.71E-06	0	6.7E-06	1.04	1.90E-07	1.43E-07	9.51E-08	4.76E-08	No
Metals	Dissolved Beryllium	Mid Upper Cook Inlet	4.00E-03	2.19E+03	1.83E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	76	1	1	1.39E-07	4.17E-09	0	4.2E-09	0.532	2.31E-10	1.73E-10	1.16E-10	5.78E-11	No
Metals	Dissolved Cadmium	Mid Upper Cook Inlet	2.10E-01	2.19E+03	9.59E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	152	1	1	1.46E-05	4.37E-07	0	4.4E-07	0.77	1.68E-08	1.26E-08	8.38E-09	4.19E-09	No
Metals	Dissolved Chromium	Mid Upper Cook Inlet	3.63E+00	2.19E+03	1.66E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	64	1	1	1.06E-04	3.18E-06	0	3.2E-06	2.4	3.91E-08	2.94E-08	1.96E-08	9.78E-09	No
Metals	Dissolved Copper	Mid Upper Cook Inlet	4.18E+01	2.19E+03	1.91E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	144	1	1	2.75E-03	8.25E-05	0	8.2E-05	5.6	4.35E-07	3.26E-07	2.17E-07	1.09E-07	No
Metals	Dissolved Lead	Mid Upper Cook Inlet	1.54E+00	2.19E+03	7.04E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	8.90E-06	2.67E-07	0	2.7E-07	4.7	1.68E-09	1.26E-09	8.38E-10	4.19E-10	No
Metals	Dissolved Mercury	Mid Upper Cook Inlet	8.94E-02	2.19E+03	4.08E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	25036	2.52	12.6	2.58E-03	7.73E-05	0	7.7E-05	1.41	1.62E-06	1.21E-06	8.09E-07	4.04E-07	No
Metals	Dissolved Molybdenum	Mid Upper Cook Inlet	4.76E+01	2.19E+03	2.17E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	2.75E-04	8.25E-06	0	8.3E-06	0.52	4.68E-07	3.51E-07	2.34E-07	1.17E-07	No
Metals	Dissolved Nickel	Mid Upper Cook Inlet	9.49E+00	2.19E+03	4.34E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	188	1	1	8.15E-04	2.45E-05	0	2.4E-05	1.7	4.24E-07	3.18E-07	2.12E-07	1.06E-07	No
Metals	Dissolved Selenium	Mid Upper Cook Inlet	1.00E+00	2.19E+03	4.57E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	5.78E-06	1.73E-07	0	1.7E-07	0.143	3.58E-08	2.68E-08	1.79E-08	8.94E-09	No
Metals	Dissolved Silver	Mid Upper Cook Inlet	4.22E-01	2.19E+03	1.93E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	2.44E-06	7.31E-08	0	7.3E-08	6.02	3.58E-10	2.69E-10	1.79E-10	8.96E-11	No
Metals	Dissolved Thallium	Mid Upper Cook Inlet	3.20E-02	2.19E+03	1.46E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	1.85E-07	5.55E-09	0	5.5E-09	0.096	1.70E-09	1.28E-09	8.52E-10	4.26E-10	No
Metals	Dissolved Zinc	Mid Upper Cook Inlet	1.24E+02	2.19E+03	5.66E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	188	1	1	1.06E-02	3.19E-04	0	3.2E-04	75.4	1.25E-07	9.37E-08	6.25E-08	3.12E-08	No
Metals	Lead	Mid Upper Cook Inlet	4.80E+00	2.19E+03	2.19E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	2.77E-05	8.32E-07	0	8.3E-07	4.7	5.22E-09	3.92E-09	2.61E-09	1.31E-09	No
Metals	Mercury	Mid Upper Cook Inlet	1.14E-01	2.19E+03	5.21E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	25036	2.52	12.6	3.29E-03	9.86E-05	0	9.9E-05	1.41	2.06E-06	1.55E-06	1.03E-06	5.16E-07	No
Metals	Molybdenum	Mid Upper Cook Inlet	4.87E+01	2.19E+03	2.22E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	2.81E-04	8.44E-06	0	8.4E-06	0.52	4.79E-07	3.59E-07	2.39E-07	1.20E-07	No
Metals	Nickel	Mid Upper Cook Inlet	6.70E+00	2.19E+03	3.06E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	188	1	1	5.75E-04	1.73E-05	0	1.7E-05	1.7	3.00E-07	2.25E-07	1.50E-07	7.49E-08	No
Metals	Selenium	Mid Upper Cook Inlet	1.20E+00	2.19E+03	5.48E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	19.52	1	1	1.07E-05	3.21E-07	0	3.2E-07	0.143	6.62E-08	4.97E-08	3.31E-08	1.66E-08	No
Metals	Silver	Mid Upper Cook Inlet	4.90E-01	2.19E+03	2.24E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	2	1	1	4.48E-07	1.34E-08	0	1.3E-08	6.02	6.58E-11	4.94E-11	3.29E-11	1.65E-11	No
Metals	Thallium	Mid Upper Cook Inlet	5.20E-02	2.19E+03	2.38E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	464	1	1	1.10E-05	3.31E-07	0	3.3E-07	0.096	1.02E-07	7.62E-08	5.08E-08	2.54E-08	No
Metals	Zinc	Mid Upper Cook Inlet	1.65E+02	2.19E+03	7.54E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	188	1	1	1.42E-02	4.25E-04	0	4.3E-04	75.4	1.66E-07	1.25E-07	8.32E-08	4.16E-08	No
Cyanide	Cyanide, Total	Mid Upper Cook Inlet	9.00E+00	2.19E+03	4.11E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	5.20E-05	1.56E-06	0	1.6E-06	0.38	1.21E-07	9.08E-08	6.06E-08	3.03E-08	No
ACE inhibitor	Enalapril	Mid Upper Cook Inlet	1.21E-02	2.19E+03	5.53E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	6.99E-08	2.10E-09	0	2.1E-09	8	7.73E-12	5.80E-12	3.87E-12	1.93E-12	No
Ammonia	Total Ammonia	Mid Upper Cook Inlet	3.30E+04	2.19E+03	1.51E+01	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	1.91E-01	5.72E-03	0	5.7E-03	--	--	--	--	--	Uncertainty
Anabolic agent	Androstenedione	Mid Upper Cook Inlet	1.62E-01	2.19E+03	7.40E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	121.2	1.028	1.007	9.22E-06	2.77E-07	0	2.8E-07	12	6.80E-10	5.10E-10	3.40E-10	1.70E-10	No
Analgesic	Ibuprofen	Mid Upper Cook Inlet	2.09E+01	2.19E+03	9.55E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1.253	1.072	1.51E-04	4.54E-06	0	4.5E-06	1.98	6.76E-08	5.07E-08	3.38E-08	1.69E-08	No
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	Mid Upper Cook Inlet	3.87E+01	2.19E+03	1.77E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1.01	1.002	2.26E-04	6.78E-06	0	6.8E-06	5.02	3.98E-08	2.99E-08	1.99E-08	9.95E-09	No
Anti-acid reflux	Ranitidine	Mid Upper Cook Inlet	8.44E-02	2.19E+03	3.86E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	4.88E-07	1.46E-08	0	1.5E-08	--	--	--	--	--	Uncertainty
Antiasthmatic	Albuterol	Mid Upper Cook Inlet	2.01E-02	2.19E+03	9.18E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	1.16E-07	3.48E-09	0	3.5E-09	8	1.28E-11	9.64E-12	6.42E-12	3.21E-12	No
Antiasthmatic	Theophylline	Mid Upper Cook Inlet	5.11E+01	2.19E+03	2.33E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	2.95E-04	8.86E-06	0	8.9E-06	0.9	2.90E-07	2.18E-07	1.45E-07	7.26E-08	No
Antibacterial	Penicillin V	Mid Upper Cook Inlet	1.34E-02	2.19E+03	6.12E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1.005	1	7.78E-08	2.33E-09	0	2.3E-09	14	4.92E-12	3.69E-12	2.46E-12	1.23E-12	No
Antibiotic	4-Epitetracycline [ETC]	Mid Upper Cook Inlet	6.62E-02	2.19E+03	3.02E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	3.83E-07	1.15E-08	0	1.1E-08	6.4	5.29E-11	3.97E-11	2.64E-11	1.32E-11	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4										
Antibiotic	Enrofloxacin	Mid Upper Cook Inlet	7.08E-04	2.19E+03	3.23E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	4.09E-09	1.23E-10	0	1.2E-10	2	1.81E-12	1.36E-12	9.05E-13	4.53E-13	No
Anticonvulsant	Benztropine	Mid Upper Cook Inlet	1.05E-03	2.19E+03	4.80E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1245.2	1.491	1.178	8.91E-07	2.67E-08	0	2.7E-08	0.1	7.88E-09	5.91E-09	3.94E-09	1.97E-09	No
Anticonvulsant	Carbamazepine	Mid Upper Cook Inlet	5.06E-01	2.19E+03	2.31E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	76.84	1.01	1.002	1.79E-05	5.38E-07	0	5.4E-07	2.116	7.50E-09	5.63E-09	3.75E-09	1.88E-09	No
Antidepressant	10-hydroxy-amitriptyline	Mid Upper Cook Inlet	1.92E-02	2.19E+03	8.77E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	330.56	1.067	1.014	3.09E-06	9.28E-08	0	9.3E-08	--	--	--	--	--	Uncertainty
Antidepressant	Amitriptyline	Mid Upper Cook Inlet	7.46E-02	2.19E+03	3.41E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	3275.6	2.78	2.193	3.10E-04	9.31E-06	0	9.3E-06	0.28	9.81E-07	7.36E-07	4.90E-07	2.45E-07	No
Antidiabetic drug	Glipizide	Mid Upper Cook Inlet	1.07E-02	2.19E+03	4.89E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	33.828	1	1	1.65E-07	4.96E-09	0	5.0E-09	--	--	--	--	--	Uncertainty
Antidiabetic drug	Glyburide	Mid Upper Cook Inlet	1.85E-02	2.19E+03	8.45E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	2689.2	2.452	1.871	5.57E-05	1.67E-06	0	1.7E-06	13	3.79E-09	2.85E-09	1.90E-09	9.48E-10	No
Antidiabetic drug	Metformin	Mid Upper Cook Inlet	8.93E+01	2.19E+03	4.08E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	5.16E-04	1.55E-05	0	1.5E-05	0.92	4.96E-07	3.72E-07	2.48E-07	1.24E-07	No
Antifungal agent	Miconazole	Mid Upper Cook Inlet	5.62E-02	2.19E+03	2.57E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	24768	12.691	21.677	8.07E-03	2.42E-04	0	2.4E-04	2.076	3.44E-06	2.58E-06	1.72E-06	8.60E-07	No
Antihistamine	Diphenhydramine	Mid Upper Cook Inlet	1.68E+00	2.19E+03	7.67E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	267.04	1.053	1.012	2.16E-04	6.47E-06	0	6.5E-06	2	9.55E-08	7.16E-08	4.77E-08	2.39E-08	No
Antihistamine	Promethazine	Mid Upper Cook Inlet	3.35E-02	2.19E+03	1.53E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	2771.2	2.452	1.871	1.04E-04	3.12E-06	0	3.1E-06	0.22	4.18E-07	3.14E-07	2.09E-07	1.05E-07	No
Antihypertensive	Diltiazem	Mid Upper Cook Inlet	4.06E-01	2.19E+03	1.85E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	112.32	1.01	1.002	2.10E-05	6.31E-07	0	6.3E-07	2.96	6.29E-09	4.72E-09	3.15E-09	1.57E-09	No
Antihypertensive	Valsartan	Mid Upper Cook Inlet	1.58E+01	2.19E+03	7.22E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	400	1.128	1.033	3.26E-03	9.77E-05	0	9.8E-05	--	--	--	--	--	Uncertainty
Antihypertensive	Verapamil	Mid Upper Cook Inlet	5.12E-02	2.19E+03	2.34E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	588.4	1.161	1.042	1.60E-05	4.79E-07	0	4.8E-07	0.456	3.10E-08	2.33E-08	1.55E-08	7.75E-09	No
Antilipemic	Gemfibrozil	Mid Upper Cook Inlet	1.33E+00	2.19E+03	6.08E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	2.452	1.871	1.88E-05	5.65E-07	0	5.7E-07	12.648	1.32E-09	9.89E-10	6.59E-10	3.30E-10	No
Antimicrobial, disinfectant	Triclocarban	Mid Upper Cook Inlet	4.89E-03	2.19E+03	2.23E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	3186	2.78	2.193	1.98E-05	5.94E-07	0	5.9E-07	138.4	1.27E-10	9.49E-11	6.33E-11	3.16E-11	No
Antimicrobial, disinfectant	Triclosan	Mid Upper Cook Inlet	4.31E+00	2.19E+03	1.97E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	2568.8	2.452	1.871	1.24E-02	3.72E-04	0	3.7E-04	6	1.83E-06	1.37E-06	9.15E-07	4.57E-07	No
Antipyretic, analgesic	Acetaminophen	Mid Upper Cook Inlet	1.22E+02	2.19E+03	5.57E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	7.05E-04	2.11E-05	0	2.1E-05	66.66	9.36E-09	7.02E-09	4.68E-09	2.34E-09	No
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	Mid Upper Cook Inlet	5.78E+01	2.19E+03	2.64E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	3.34E-04	1.00E-05	0	1.0E-05	--	--	--	--	--	Uncertainty
Betablocker	Atenolol	Mid Upper Cook Inlet	1.88E+00	2.19E+03	8.59E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	1.09E-05	3.26E-07	0	3.3E-07	8	1.20E-09	9.01E-10	6.01E-10	3.00E-10	No
Betablocker	Metoprolol	Mid Upper Cook Inlet	4.89E-01	2.19E+03	2.23E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	17.944	1	1	4.01E-06	1.20E-07	0	1.2E-07	4.632	7.66E-10	5.74E-10	3.83E-10	1.91E-10	No
Betablocker	Propranolol	Mid Upper Cook Inlet	7.48E-02	2.19E+03	3.42E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	203.96	1.083	1.019	7.55E-06	2.26E-07	0	2.3E-07	1.28	5.22E-09	3.91E-09	2.61E-09	1.30E-09	No
BloodThinner	Warfarin	Mid Upper Cook Inlet	4.03E-03	2.19E+03	1.84E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	112.32	1.01	1.002	2.09E-07	6.27E-09	0	6.3E-09	0.0064	2.89E-08	2.17E-08	1.44E-08	7.22E-09	No
ChannelBlocker	Amlodipine	Mid Upper Cook Inlet	2.48E-02	2.19E+03	1.13E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	177.2	1.028	1.007	2.06E-06	6.19E-08	0	6.2E-08	2	9.13E-10	6.85E-10	4.57E-10	2.28E-10	No
ChannelBlocker	Dehydronifedipine	Mid Upper Cook Inlet	1.40E-03	2.19E+03	6.40E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	222.96	1.042	1.009	1.49E-07	4.46E-09	0	4.5E-09	--	--	--	--	--	Uncertainty
ChannelBlocker	Desmethyldiltiazem	Mid Upper Cook Inlet	8.36E-02	2.19E+03	3.82E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	112.32	1.01	1.002	4.33E-06	1.30E-07	0	1.3E-07	--	--	--	--	--	Uncertainty
ChannelBlocker	Norverapamil	Mid Upper Cook Inlet	1.89E-02	2.19E+03	8.63E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1970.4	1.95	1.459	3.32E-05	9.95E-07	0	1.0E-06	0.032	9.17E-07	6.88E-07	4.59E-07	2.29E-07	No
Cocaine metabolite	Benzoylecgonine	Mid Upper Cook Inlet	1.96E+00	2.19E+03	8.95E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	1.13E-05	3.40E-07	0	3.4E-07	0.3804	2.63E-08	1.98E-08	1.32E-08	6.59E-09	No
Contraceptive	Norgestrel	Mid Upper Cook Inlet	8.18E-02	2.19E+03	3.74E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	367.32	1.083	1.019	1.49E-05	4.46E-07	0	4.5E-07	20.04	6.56E-10	4.92E-10	3.28E-10	1.64E-10	No
Corticosteroid	Hydrocortisone	Mid Upper Cook Inlet	7.82E-01	2.19E+03	3.57E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	21.444	1	1	7.66E-06	2.30E-07	0	2.3E-07	0.6	1.13E-08	8.47E-09	5.65E-09	2.82E-09	No
Depressant	Alprazolam	Mid Upper Cook Inlet	3.23E-03	2.19E+03	1.48E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	46.56	1.005	1	6.90E-08	2.07E-09	0	2.1E-09	2.16	2.83E-11	2.12E-11	1.41E-11	7.07E-12	No
Depressant	Diazepam	Mid Upper Cook Inlet	8.27E-04	2.19E+03	3.78E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	134.8	1.028	1.007	5.24E-08	1.57E-09	0	1.6E-09	1.112	4.17E-11	3.12E-11	2.08E-11	1.04E-11	No
Diuretic	Furosemide	Mid Upper Cook Inlet	2.08E-01	2.19E+03	9.50E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1.005	1	1.21E-06	3.62E-08	0	3.6E-08	10.4	1.03E-10	7.71E-11	5.14E-11	2.57E-11	No
Diuretic	Hydrochlorothiazide	Mid Upper Cook Inlet	1.07E+00	2.19E+03	4.89E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	6.18E-06	1.85E-07	0	1.9E-07	12.32	4.44E-10	3.33E-10	2.22E-10	1.11E-10	No
Diuretic	Triamterene	Mid Upper Cook Inlet	9.41E-02	2.19E+03	4.30E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	5.44E-07	1.63E-08	0	1.6E-08	1.6	3.01E-10	2.26E-10	1.50E-10	7.52E-11	No
Fungicide and parasiticide	Thiabendazole	Mid Upper Cook Inlet	3.06E-02	2.19E+03	1.40E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	79.2	1.01	1.002	1.12E-06	3.35E-08	0	3.4E-08	5.2	1.90E-10	1.43E-10	9.52E-11	4.76E-11	No
Glycoside	Digoxin	Mid Upper Cook Inlet	7.01E-02	2.19E+03	3.20E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.6	1	1	4.03E-07	1.21E-08	0	1.2E-08	0.07112	5.02E-09	3.77E-09	2.51E-09	1.26E-09	No
Lincosamide antibiotic	Lincomycin	Mid Upper Cook Inlet	4.35E-02	2.19E+03	1.99E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	2.51E-07	7.54E-09	0	7.5E-09	3.132	7.10E-11	5.33E-11	3.55E-11	1.78E-11	No
Macrolide antibiotic	Azithromycin	Mid Upper Cook Inlet	3.41E-01	2.19E+03	1.56E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	834.4	1.253	1.072	1.63E-04	4.89E-06	0	4.9E-06	12	1.20E-08	9.01E-09	6.01E-09	3.00E-09	No
Macrolide antibiotic	Clarithromycin	Mid Upper Cook Inlet	1.65E-01	2.19E+03	7.54E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	225.96	1.042	1.009	1.77E-05	5.32E-07	0	5.3E-07	5.08	3.09E-09	2.32E-09	1.55E-09	7.73E-10	No
Macrolide antibiotic	Erythromycin-H2O	Mid Upper Cook Inlet	1.68E-01	2.19E+03	7.67E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	194.12	1.034	1.007	1.54E-05	4.62E-07	0	4.6E-07	10.32	1.32E-09	9.91E-10	6.61E-10	3.30E-10	No
Macrolide antibiotic	Roxithromycin	Mid Upper Cook Inlet	9.41E-04	2.19E+03	4.30E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	121.36	1.028	1.007	5.36E-08	1.61E-09	0	1.6E-09	0.8	5.93E-11	4.45E-11	2.97E-11	1.48E-11	No
Macrolide antibiotic	Tylosin	Mid Upper Cook Inlet	1.43E-03	2.19E+03	6.53E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	22.108	1	1	1.44E-08	4.33E-10	0	4.3E-10	3.2	3.99E-12	3.00E-12	2.00E-12	9.99E-13	No
Nicotinemetabolite	Cotinine	Mid Upper Cook Inlet	2.80E+00	2.19E+03	1.28E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	1.62E-05	4.85E-07	0	4.9E-07	6.416	2.23E-09	1.67E-09	1.12E-09	5.58E-10	No
Non-steroidalanti-inflammatory dr	Naproxen	Mid Upper Cook Inlet	1.24E+01	2.19E+03	5.66E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1.042	1.009	7.47E-05	2.24E-06	0	2.2E-06	4.936	1.34E-08	1.00E-08	6.69E-09	3.35E-09	No
Oil & Grease	Oil and Grease, Total (HEM)	Mid Upper Cook Inlet	4.27E+04	2.19E+03	1.95E+01	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	0	0	0	0.00E+00	0.00E+00	0	0.0E+00	--	--	--	--	--	Uncertainty
Opiate	Codeine	Mid Upper Cook Inlet	1.52E-01	2.19E+03	6.94E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	11.328	1	1	7.87E-07	2.36E-08	0	2.4E-08	1.708	4.08E-10	3.06E-10	2.04E-10	1.02E-10	No
Opiate	Hydrocodone	Mid Upper Cook Inlet	6.87E-02	2.19E+03	3.14E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	49.8	1.005	1	1.57E-06	4.71E-08	0	4.7E-08	1.5	9.27E-10	6.95E-10	4.63E-10	2.32E-10	No
Opiate	Oxycodone	Mid Upper Cook Inlet	1.60E-01	2.19E+03	7.31E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	9.24E-07	2.77E-08	0	2.8E-08	1.28	6.39E-10	4.79E-10	3.20E-10	1.60E-10	No
Opiod	Propoxyphene	Mid Upper Cook Inlet	1.02E-02	2.19E+03	4.66E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1064.4	1.38	1.13	6.84E-06	2.05E-07	0	2.1E-07	0.54	1.12E-08	8.41E-09	5.61E-09	2.80E-09	No
PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-2	Mid Upper Cook Inlet	2.58E-02	2.19E+03	1.18E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	166.84	1.493	0.226	2.94E-06	8.81E-08	0	8.8E-08	2.22	1.17E-09	8.78E-10	5.85E-10	2.93E-10	No
PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	Mid Upper Cook Inlet	5.24E-03	2.19E+03	2.39E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	60560	14.355	26.669	2.08E-03	6.24E-05	0	6.2E-05	0.5	3.68E-06	2.76E-06	1.84E-06	9.21E-07	No
PBDEs	2,2',3,4,4',5,5',6-OcBDE	Mid Upper Cook Inlet	1.41E-03	2.19E+03	6.44E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	7728	2.732	0.778	1.36E-05	4.08E-07	0	4.1E-07	0.07	1.72E-07	1.29E-07	8.60E-08	4.30E-08	No
PBDEs	2,2',3,4,4',5',6-HpBDE	Mid Upper Cook Inlet	6.87E-04	2.19E+03	3.14E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	3393.2	1.493	0.226	1.59E-06	4.77E-08	0	4.8E-08	0.07	2.01E-08	1.51E-08	1.01E-08	5.03E-09	No
PBDEs	2,2',3,4,4',5'-HxBDE	Mid Upper Cook Inlet	4.94E-04	2.19E+03	2.26E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	9264	3.296	1.146	6.89E-06	2.07E-07	0	2.1E-07	0.07	8.71E-08	6.53E-08	4.36E-08	2.18E-08	No
PBDEs	2,2',3,4,4',6'-HxBDE	Mid Upper Cook Inlet	1.54E-04	2.19E+03	7.04E-08	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	9264	3.296	1.146	2.15E-06	6.44E-08	0	6.4E-08	0.07	2.72E-08	2.04E-08	1.36E-08	6.79E-09	No
PBDEs	2,2',3,4,4'-PeBDE	Mid Upper Cook Inlet	1.82E-03	2.19E+03	8.31E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	25280	10.914	14.388	2.29E-04	6.88E-06	0	6.9E-06	0.07	2.90E-06	2.18E-06	1.45E-06	7.25E-07	No
PBDEs	2,2',4,4',5,5'-HxBDE	Mid Upper Cook Inlet	3.60E-03	2.19E+03	1.64E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	9264	3.296	1.146	5.02E-05	1.51E-06	0	1.5E-06	0.07	6.35E-07	4.76E-07	3.17E-07	1.59E-07	No
PBDEs	2,2',4,4',5,6'-HxBDE	Mid Upper Cook Inlet	3.05E-03	2.19E+03	1.39E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	9264	3.296	1.146	4.25E-05	1.28E-06	0	1.3E-06	0.07	5.38E-07	4.03E-07	2.69E-07	1.34E-07	No
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	Mid Upper Cook Inlet	4.06E-02	2.19E+03	1.85E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	60560	14.355	26.669	1.61E-02	4.84E-04	0	4.8E-04	0.058	2.46E-04	1.85E-04	1.23E-04	6.15E-05	No
PBDEs	2,2',4,4',6,6'-HxBDE	Mid Upper Cook Inlet	2.13E-04	2.19E+03	9.73E-08	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	9264	3.296	1.146	2.97E-06	8.91E-08	0	8.9E-08	0.07	3.76E-08	2.82E-08	1.88E-08	9.39E-09	No
PBDEs	2,2',4,4',6-PeBDE	Mid Upper Cook Inlet	8.11E-03	2.19E+03	3.70E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	25280	10.914	14.388	1.02E-03	3.07E-05	0	3.1E-05	0.07	1.29E-05	9.69E-06	6.46E-06	3.23E-06	No
PBDEs	2,2',4,4'-TeBDE (BDE-47)	Mid Upper Cook Inlet	4.32E-02	2.19E+03	1.97E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	54400	14.355	26.669	1.54E-02	4.62E-04	0	4.6E-04	0.07	1.95E-04	1.46E-04	9.74E-05	4.87E-05	No
PBDEs	2,2',4,5'-TeBDE	Mid Upper Cook Inlet	1.56E-03	2.19E+03	7.13E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	54400	14.355	26.669	5.57E-04	1.67E-05	0	1.7E-05	0.07	7.04E-06	5.28E-06	3.52E-06	1.76E-06	No
PBDEs	2,2',4,6'-TeBDE	Mid Upper Cook Inlet	2.40E-04	2.19E+03	1.10E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	54400	14.355	26.669	8.56E-05	2.57E-06	0	2.6E-06	0.07	1.08E-06	8.12E-07	5.41E-07	2.71E-07	No
PBDEs	2,2',4-TriBDE	Mid Upper Cook Inlet	1.11E-03	2.19E+03	5.07E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	14076	9.716	13.964	6.93E-05	2.08E-06	0	2.1E-06	0.07	8.77E-07	6.58E-07	4.38E-07	2.19E-07	No
PBDEs	2,3',4,4',6-PeBDE	Mid Upper Cook Inlet	2.02E-04	2.19E+03	9.23E-08	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	25280	10.914	14.388	2.55E-05	7.64E-07	0	7.6E-07	0.07	3.22E-07	2.41E-07	1.61E-07	8.05E-08	No
PBDEs	2,3',4,4'-TeBDE	Mid Upper Cook Inlet	1.50E-03	2.19E+03	6.85E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	54400	14.355	26.669	5.35E-04	1.61E-05	0	1.6E-05	0.07	6.77E-06	5.07E-06	3.38E-06	1.69E-06	No
PBDEs	2,3',4',6-TeBDE	Mid Upper Cook Inlet	5.58E-04	2.19E+03	2.55E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	54400	14.355	26.669	1.99E-04	5.97E-06	0	6.0E-06	0.07	2.52E-06	1.89E-06	1.26E-06	6.29E-07	No
PBDEs	2,4,4'-TriBDE	Mid Upper Cook Inlet	1.35E-03	2.19E+03	6.17E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	14076	9.716	13.964	8.43E-05	2.53E-06	0	2.5E-06	0.07	1.07E-06	8.00E-07	5.33E-07	2.67E-07	No
Pesticides	2,4'-DDD	Mid Upper Cook Inlet	1.07E-03	2.19E+03	4.89E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	13944	9.716	13.964	6.62E-05	1.99E-06	0	2.0E-06	0.147	3.99E-07	2.99E-07	1.99E-07	9.97E-08	No
Pesticides	4,4'-DDD	Mid Upper Cook Inlet	2.10E-02	2.19E+03	9.59E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	17420	10.556	15.996	1.76E-03	5.29E-05	0	5.3E-05	0.147	1.06E-05	7.97E-06	5.31E-06	2.66E-06	No
Pesticides	4,4'-DDE	Mid Upper Cook Inlet	4.70E-03	2.19E+03	2.15E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	36672	13.662	24.604	1.08E-03	3.23E-05	0	3.2E-05	0.147	6.48E-06	4.86E-06	3.24E-06	1.62E-06	No
Pesticides	4,4'-DDT	Mid Upper Cook Inlet	1.86E-04	2.19E+03	8.50E-08	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	67360	14.388	26.669	8.24E-05	2.47E-06	0	2.5E-06	0.147	4.96E-07	3.72E-07	2.48E-07	1.24E-07	No
Pesticides	Aldrin	Mid Upper Cook Inlet	9.70E-03	2.19E+03	4.43E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	36120	13.662	24.604	2.19E-03	6.56E-05	0	6.6E-05	0.2	9.68E-06	7.26E-06	4.84E-06	2.42E-06	No
Pesticides	Chlordane, alpha (cis)	Mid Upper Cook Inlet	1.42E-04	2.19E+03	6.49E-08	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	23604	12.064	19.907	1.85E-05	5.54E-07	0	5.5E-07	0.15	1.09E-07	8.17E-08	5.45E-08	2.72E-08	No
Pesticides	Chlorpyriphos	Mid Upper Cook Inlet	9.72E-04	2.19E+03	4.44E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	3480.8	3.181	2.612	4.92E-06	1.47E-07	0	1.5E-07	0.1	4.35E-08	3.26E-08	2.18E-08	1.09E-08	No
Pesticides	Chlorpyriphos-Methyl	Mid Upper Cook Inlet	2.11E-04	2.19E+03	9.64E-08	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1296.4	1.491	1.178	1.86E-07	5.59E-09	0	5.6E-09	0.1	1.65E-09	1.24E-09	8.24E-10	4.12E-10	No
Pesticides	Cypermethrin	Mid Upper Cook Inlet	4.05E-03	2.19E+03	1.85E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	3881.2	14.388	26.669	1.03E-04	3.10E-06	0	3.1E-06	0.2	4.57E-07	3.43E-07	2.29E-07	1.14E-07	No
Pesticides

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
Pesticides	Demeton-O,S	Mid Upper Cook Inlet	3.80E-02	2.19E+03	1.74E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	38.352	1	1	6.66E-07	2.00E-08	0	2.0E-08	0.008	7.37E-08	5.52E-08	3.68E-08	1.84E-08	No
Pesticides	Dieldrin	Mid Upper Cook Inlet	1.40E-02	2.19E+03	6.40E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	5012	4.188	3.873	1.34E-04	4.03E-06	0	4.0E-06	0.015	7.92E-06	5.94E-06	3.96E-06	1.98E-06	No
Pesticides	Endosulfan Sulfate	Mid Upper Cook Inlet	2.20E-02	2.19E+03	1.01E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	482.8	1.128	1.033	5.47E-06	1.64E-07	0	1.6E-07	0.058	8.35E-08	6.26E-08	4.18E-08	2.09E-08	No
Pesticides	Endrin	Mid Upper Cook Inlet	6.20E-05	2.19E+03	2.83E-08	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	5012	4.188	3.873	5.95E-07	1.78E-08	0	1.8E-08	0.184	2.86E-09	2.14E-09	1.43E-09	7.15E-10	No
Pesticides	Endrin Ketone	Mid Upper Cook Inlet	9.60E-03	2.19E+03	4.39E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	3623.2	3.181	2.612	5.05E-05	1.52E-06	0	1.5E-06	0.184	2.43E-07	1.82E-07	1.22E-07	6.08E-08	No
Pesticides	HCH, alpha	Mid Upper Cook Inlet	6.60E-05	2.19E+03	3.02E-08	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1001.6	1.315	1.096	3.97E-08	1.19E-09	0	1.2E-09	87	4.04E-13	3.03E-13	2.02E-13	1.01E-13	No
Pesticides	HCH, beta	Mid Upper Cook Inlet	1.09E-04	2.19E+03	4.98E-08	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1001.6	1.315	1.096	6.56E-08	1.97E-09	0	2.0E-09	0.4	1.45E-10	1.09E-10	7.26E-11	3.63E-11	No
Pesticides	HCH, gamma	Mid Upper Cook Inlet	6.96E-04	2.19E+03	3.18E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1001.6	1.315	1.096	4.19E-07	1.26E-08	0	1.3E-08	0.014	2.65E-08	1.99E-08	1.32E-08	6.62E-09	No
Pesticides	Heptachlor	Mid Upper Cook Inlet	1.40E-02	2.19E+03	6.40E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	7552	6.266	7.079	3.03E-04	9.08E-06	0	9.1E-06	0.2	1.34E-06	1.00E-06	6.70E-07	3.35E-07	No
Pesticides	Hexachlorobenzene	Mid Upper Cook Inlet	5.17E-04	2.19E+03	2.36E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	11212	7.962	10.209	2.11E-05	6.33E-07	0	6.3E-07	7.1	2.63E-09	1.97E-09	1.31E-09	6.57E-10	No
Pesticides	Malathion	Mid Upper Cook Inlet	5.20E-01	2.19E+03	2.38E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	67	1.01	1.002	1.61E-05	4.82E-07	0	4.8E-07	0.046	3.09E-07	2.32E-07	1.55E-07	7.73E-08	No
Pesticides	Methoxychlor	Mid Upper Cook Inlet	2.90E-03	2.19E+03	1.32E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	4176	3.643	3.162	2.02E-05	6.05E-07	0	6.0E-07	1.002	1.78E-08	1.34E-08	8.90E-09	4.45E-09	No
Pesticides	Permethrin	Mid Upper Cook Inlet	4.23E-02	2.19E+03	1.93E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1989.2	13.662	24.604	5.25E-04	1.58E-05	0	1.6E-05	5	9.30E-08	6.97E-08	4.65E-08	2.32E-08	No
PFAS	5:3 FTCA	Mid Upper Cook Inlet	5.92E-02	2.19E+03	2.70E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1.766	1.334	6.04E-07	1.81E-08	0	1.8E-08	5	1.07E-10	8.02E-11	5.35E-11	2.67E-11	No
PFAS	PFBA	Mid Upper Cook Inlet	1.49E-02	2.19E+03	6.81E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1.005	1	8.65E-08	2.60E-09	0	2.6E-09	35	2.19E-12	1.64E-12	1.09E-12	5.47E-13	No
PFAS	PFHpA	Mid Upper Cook Inlet	8.47E-03	2.19E+03	3.87E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1.315	1.096	6.44E-08	1.93E-09	0	1.9E-09	--	--	--	--	--	Uncertainty
PFAS	PFHxA	Mid Upper Cook Inlet	2.55E-02	2.19E+03	1.16E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1.083	1.019	1.60E-07	4.79E-09	0	4.8E-09	20	7.06E-12	5.30E-12	3.53E-12	1.77E-12	No
PFAS	PFHxS	Mid Upper Cook Inlet	3.96E-02	2.19E+03	1.81E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1.042	1.009	2.38E-07	7.15E-09	0	7.2E-09	5.72	3.69E-11	2.77E-11	1.84E-11	9.22E-12	No
PFAS	PFNA	Mid Upper Cook Inlet	5.14E-03	2.19E+03	2.35E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	40	6.266	7.079	5.89E-07	1.77E-08	0	1.8E-08	0.166	3.14E-09	2.35E-09	1.57E-09	7.84E-10	No
PFAS	PFOA	Mid Upper Cook Inlet	1.85E-02	2.19E+03	8.45E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	2.452	1.871	2.62E-07	7.86E-09	0	7.9E-09	1.75	1.33E-10	9.94E-11	6.63E-11	3.31E-11	No
PFAS	PFOS	Mid Upper Cook Inlet	6.53E-02	2.19E+03	2.98E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1.766	1.334	6.66E-07	2.00E-08	0	2.0E-08	0.12	4.91E-09	3.69E-09	2.46E-09	1.23E-09	No
PFAS	PFPeA	Mid Upper Cook Inlet	2.03E-02	2.19E+03	9.27E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1.028	1.007	1.21E-07	3.62E-09	0	3.6E-09	--	--	--	--	--	Uncertainty
PFAS	PFPeS	Mid Upper Cook Inlet	3.84E-03	2.19E+03	1.75E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1.01	1.002	2.24E-08	6.72E-10	0	6.7E-10	--	--	--	--	--	Uncertainty
Plasticizer	Bisphenol A	Mid Upper Cook Inlet	1.59E+00	2.19E+03	7.26E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	288.12	1.053	1.012	2.20E-04	6.61E-06	0	6.6E-06	10	1.95E-08	1.46E-08	9.75E-09	4.88E-09	No
Plasticizer	Bisphenol S	Mid Upper Cook Inlet	8.88E-01	2.19E+03	4.06E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	22.672	1	1	9.20E-06	2.76E-07	0	2.8E-07	10	8.14E-10	6.10E-10	4.07E-10	2.03E-10	No
Pyrimidine antibiotic	Trimethoprim	Mid Upper Cook Inlet	7.11E-01	2.19E+03	3.25E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	4.11E-06	1.23E-07	0	1.2E-07	0.8	4.54E-09	3.41E-09	2.27E-09	1.14E-09	No
Quinoline antibiotic	Ciprofloxacin	Mid Upper Cook Inlet	3.72E-01	2.19E+03	1.70E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	2.15E-06	6.45E-08	0	6.4E-08	4	4.76E-10	3.57E-10	2.38E-10	1.19E-10	No
Quinoline antibiotic	Ofloxacin	Mid Upper Cook Inlet	4.27E-01	2.19E+03	1.95E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	2.47E-06	7.40E-08	0	7.4E-08	2	1.09E-09	8.19E-10	5.46E-10	2.73E-10	No
Rubber Stabilizing compound	6PPD-Quinone	Mid Upper Cook Inlet	5.30E-03	2.19E+03	2.42E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	781.6	1.253	1.072	2.37E-06	7.11E-08	0	7.1E-08	2	1.05E-09	7.87E-10	5.25E-10	2.62E-10	No
Sex hormone	17 beta-Estradiol	Mid Upper Cook Inlet	5.52E-03	2.19E+03	2.52E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	822	1.253	1.072	2.60E-06	7.79E-08	0	7.8E-08	0.01	2.30E-07	1.72E-07	1.15E-07	5.75E-08	No
Sex hormone	Estrone	Mid Upper Cook Inlet	3.31E-02	2.19E+03	1.51E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	215.88	1.034	1.007	3.38E-06	1.01E-07	0	1.0E-07	--	--	--	--	--	Uncertainty
Sex hormone	Progesterone	Mid Upper Cook Inlet	5.66E-02	2.19E+03	2.59E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	664.4	1.202	1.054	2.06E-05	6.19E-07	0	6.2E-07	0.66	2.77E-08	2.08E-08	1.38E-08	6.92E-09	No
Sex hormone	Testosterone	Mid Upper Cook Inlet	7.17E-02	2.19E+03	3.28E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	288.12	1.053	1.012	9.94E-06	2.98E-07	0	3.0E-07	1.72	5.11E-09	3.83E-09	2.56E-09	1.28E-09	No
SSRI Antidepressant	Fluoxetine	Mid Upper Cook Inlet	5.20E-02	2.19E+03	2.38E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	616	1.161	1.042	1.70E-05	5.10E-07	0	5.1E-07	1.136	1.32E-08	9.93E-09	6.62E-09	3.31E-09	No
SSRI Antidepressant	Norfluoxetine	Mid Upper Cook Inlet	2.73E-02	2.19E+03	1.25E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1068	1.38	1.13	1.84E-05	5.51E-07	0	5.5E-07	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Paroxetine	Mid Upper Cook Inlet	1.88E-02	2.19E+03	8.59E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	754.4	1.253	1.072	8.12E-06	2.44E-07	0	2.4E-07	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Sertraline	Mid Upper Cook Inlet	1.08E-01	2.19E+03	4.93E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	5716	4.803	4.742	1.35E-03	4.06E-05	0	4.1E-05	--	--	--	--	--	Uncertainty
Statin	Atorvastatin	Mid Upper Cook Inlet	2.20E-01	2.19E+03	1.01E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	224.92	13.228	23.281	2.99E-04	8.97E-06	0	9.0E-06	20	1.32E-08	9.92E-09	6.62E-09	3.31E-09	No
Steroid	Methylprednisolone	Mid Upper Cook Inlet	1.13E-01	2.19E+03	5.16E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	29.396	1	1	1.52E-06	4.55E-08	0	4.6E-08	8	1.68E-10	1.26E-10	8.39E-11	4.20E-11	No
Steroid	Prednisolone	Mid Upper Cook Inlet	9.31E-03	2.19E+03	4.25E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	21.772	1	1	9.26E-08	2.78E-09	0	2.8E-09	6.72	1.22E-11	9.15E-12	6.10E-12	3.05E-12	No
Steroidal Estrogen	Equilenin	Mid Upper Cook Inlet	1.34E-02	2.19E+03	6.12E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	726.4	1.202	1.054	5.34E-06	1.60E-07	0	1.6E-07	--	--	--	--	--	Uncertainty
Stimulant	Amphetamine	Mid Upper Cook Inlet	5.39E-01	2.19E+03	2.46E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	26.936	1	1	6.63E-06	1.99E-07	0	2.0E-07	0.12	4.89E-08	3.67E-08	2.45E-08	1.22E-08	No
Stimulant	Caffeine	Mid Upper Cook Inlet	1.05E+02	2.19E+03	4.80E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	6.07E-04	1.82E-05	0	1.8E-05	0.508	1.06E-06	7.93E-07	5.28E-07	2.64E-07	No
Stimulant	Cocaine	Mid Upper Cook Inlet	7.68E-01	2.19E+03	3.51E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	61.16	1.01	1.002	2.17E-05	6.50E-07	0	6.5E-07	0.396	4.84E-08	3.63E-08	2.42E-08	1.21E-08	No
Streoid	Prednisone	Mid Upper Cook Inlet	4.04E-01	2.19E+03	1.85E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	17.076	1	1	3.15E-06	9.45E-08	0	9.5E-08	--	--	--	--	--	Uncertainty
Sulfonamide antibiotic	Sulfadiazine	Mid Upper Cook Inlet	1.46E-03	2.19E+03	6.67E-07	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	8.44E-09	2.53E-10	0	2.5E-10	6	1.24E-12	9.33E-13	6.22E-13	3.11E-13	No
Sulfonamide antibiotic	Sulfamethizole	Mid Upper Cook Inlet	5.11E-03	2.19E+03	2.33E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	2.95E-08	8.86E-10	0	8.9E-10	14	1.87E-12	1.40E-12	9.33E-13	4.67E-13	No
Sulfonamide antibiotic	Sulfamethoxazole	Mid Upper Cook Inlet	1.08E+00	2.19E+03	4.93E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	6.24E-06	1.87E-07	0	1.9E-07	9.2	6.00E-10	4.50E-10	3.00E-10	1.50E-10	No
Sulfonamide antibiotic	Sulfanilamide	Mid Upper Cook Inlet	3.48E-02	2.19E+03	1.59E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	2.01E-07	6.03E-09	0	6.0E-09	12	1.48E-11	1.11E-11	7.41E-12	3.71E-12	No
SVOCs/PAHs	1,2-Diphenylhydrazine	Mid Upper Cook Inlet	2.50E+00	2.19E+03	1.14E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	161.76	1.028	1.007	1.90E-04	5.70E-06	0	5.7E-06	--	--	--	--	--	Uncertainty
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	Mid Upper Cook Inlet	1.00E-01	2.19E+03	4.57E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	2775.2	2.452	1.871	3.11E-04	9.33E-06	0	9.3E-06	65.6	4.19E-09	3.15E-09	2.10E-09	1.05E-09	No
SVOCs/PAHs	1-Methyldibenzothiophene	Mid Upper Cook Inlet	5.00E-02	2.19E+03	2.28E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	2390	2.175	1.633	1.19E-04	3.56E-06	0	3.6E-06	65.6	1.60E-09	1.20E-09	8.01E-10	4.00E-10	No
SVOCs/PAHs	1-Methylfluorene	Mid Upper Cook Inlet	5.00E-02	2.19E+03	2.28E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	3534	3.181	2.612	2.57E-04	7.70E-06	0	7.7E-06	65.6	3.46E-09	2.60E-09	1.73E-09	8.66E-10	No
SVOCs/PAHs	1-Methylnaphthalene	Mid Upper Cook Inlet	4.27E-01	2.19E+03	1.95E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	664.4	1.202	1.054	1.56E-04	4.67E-06	0	4.7E-06	0.94	1.47E-07	1.10E-07	7.33E-08	3.67E-08	No
SVOCs/PAHs	1-Methylphenanthrene	Mid Upper Cook Inlet	2.85E-02	2.19E+03	1.30E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	19132	3.643	3.162	9.07E-04	2.72E-05	0	2.7E-05	65.6	1.22E-08	9.18E-09	6.12E-09	3.06E-09	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Mid Upper Cook Inlet	1.20E+00	2.19E+03	5.48E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	505.6	1.128	1.033	3.13E-04	9.38E-06	0	9.4E-06	3	9.22E-08	6.92E-08	4.61E-08	2.31E-08	No
SVOCs/PAHs	2,6-Dimethylnaphthalene	Mid Upper Cook Inlet	3.44E-01	2.19E+03	1.57E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1296.4	1.491	1.178	3.04E-04	9.11E-06	0	9.1E-06	65.6	4.10E-09	3.07E-09	2.05E-09	1.02E-09	No
SVOCs/PAHs	2-Methylanthracene	Mid Upper Cook Inlet	6.36E-02	2.19E+03	2.91E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	3698.8	3.181	2.612	3.42E-04	1.03E-05	0	1.0E-05	65.6	4.61E-09	3.46E-09	2.31E-09	1.15E-09	No
SVOCs/PAHs	2-Methylfluoranthene	Mid Upper Cook Inlet	1.74E-02	2.19E+03	7.95E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	7672	6.266	7.079	3.82E-04	1.15E-05	0	1.1E-05	65.6	5.16E-09	3.87E-09	2.58E-09	1.29E-09	No
SVOCs/PAHs	2-Methylnaphthalene	Mid Upper Cook Inlet	5.41E-01	2.19E+03	2.47E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	654.4	1.202	1.054	1.94E-04	5.83E-06	0	5.8E-06	65.6	2.62E-09	1.97E-09	1.31E-09	6.56E-10	No
SVOCs/PAHs	2-Methylphenanthrene	Mid Upper Cook Inlet	6.47E-02	2.19E+03	2.96E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	13696	2.78	2.193	1.13E-03	3.38E-05	0	3.4E-05	65.6	1.52E-08	1.14E-08	7.59E-09	3.80E-09	No
SVOCs/PAHs	3,6-Dimethylphenanthrene	Mid Upper Cook Inlet	1.89E-02	2.19E+03	8.63E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	33036	5.502	5.821	1.57E-03	4.71E-05	0	4.7E-05	65.6	2.12E-08	1.59E-08	1.06E-08	5.29E-09	No
SVOCs/PAHs	3-Methylphenanthrene	Mid Upper Cook Inlet	5.79E-02	2.19E+03	2.65E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	13696	2.78	2.193	1.01E-03	3.02E-05	0	3.0E-05	65.6	1.36E-08	1.02E-08	6.79E-09	3.40E-09	No
SVOCs/PAHs	4-Methyldibenzothiophene	Mid Upper Cook Inlet	2.29E-02	2.19E+03	1.05E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	2390	2.175	1.633	5.44E-05	1.63E-06	0	1.6E-06	65.6	7.34E-10	5.50E-10	3.67E-10	1.83E-10	No
SVOCs/PAHs	Acenaphthene	Mid Upper Cook Inlet	8.21E-02	2.19E+03	3.75E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	716.8	1.202	1.054	3.23E-05	9.69E-07	0	9.7E-07	65.6	4.36E-10	3.27E-10	2.18E-10	1.09E-10	No
SVOCs/PAHs	Acenaphthylene	Mid Upper Cook Inlet	1.25E-02	2.19E+03	5.71E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	739.2	1.202	1.054	5.07E-06	1.52E-07	0	1.5E-07	65.6	6.84E-11	5.13E-11	3.42E-11	1.71E-11	No
SVOCs/PAHs	Anthracene	Mid Upper Cook Inlet	5.53E-02	2.19E+03	2.53E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1604	1.766	1.334	7.16E-05	2.15E-06	0	2.1E-06	65.6	9.65E-10	7.24E-10	4.83E-10	2.41E-10	No
SVOCs/PAHs	Benz(a)anthracene	Mid Upper Cook Inlet	2.50E-01	2.19E+03	1.14E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	11736	8.841	12.05	1.18E-02	3.55E-04	0	3.6E-04	0.62	1.69E-05	1.27E-05	8.46E-06	4.23E-06	No
SVOCs/PAHs	Benzo(a)fluoranthene	Mid Upper Cook Inlet	1.51E-02	2.19E+03	6.90E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12096	8.841	12.05	7.38E-04	2.21E-05	0	2.2E-05	0.615	1.06E-06	7.96E-07	5.31E-07	2.65E-07	No
SVOCs/PAHs	Benzo(a)pyrene	Mid Upper Cook Inlet	5.63E-02	2.19E+03	2.57E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	20588	11.337	17.783	6.00E-03	1.80E-04	0	1.8E-04	0.62	8.57E-06	6.43E-06	4.28E-06	2.14E-06	No
SVOCs/PAHs	Benzo(b)fluoranthene	Mid Upper Cook Inlet	4.90E-02	2.19E+03	2.24E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12096	8.841	12.05	2.39E-03	7.18E-05	0	7.2E-05	0.62	3.42E-06	2.56E-06	1.71E-06	8.54E-07	No
SVOCs/PAHs	Benzo(b)fluorene	Mid Upper Cook Inlet	4.06E-02	2.19E+03	1.85E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	11916	8.841	12.05	1.95E-03	5.86E-05	0	5.9E-05	0.615	2.81E-06	2.11E-06	1.41E-06	7.03E-07	No
SVOCs/PAHs	Benzo(e)pyrene	Mid Upper Cook Inlet	5.23E-02	2.19E+03	2.39E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	32976	13.228	23.281	1.04E-02	3.13E-04	0	3.1E-04	0.615	1.50E-05	1.12E-05	7.50E-06	3.75E-06	No
SVOCs/PAHs	Benzo(g,h,i)perylene	Mid Upper Cook Inlet	8.33E-02	2.19E+03	3.81E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	44000	13.98	25.645	2.34E-02	7.02E-04	0	7.0E-04	14.4	1.44E-06	1.08E-06	7.19E-07	3.60E-07	No
SVOCs/PAHs	Benzo(k,j)fluoranthene	Mid Upper Cook Inlet	3.34E-02	2.19E+03	1.53E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	19972	11.337	17.783	3.45E-03	1.04E-04	0	1.0E-04	0.615	4.97E-06	3.73E-06	2.49E-06	1.24E-06	No
SVOCs/PAHs	Benzothiophene	Mid Upper Cook Inlet	1.44E-02	2.19E+03	6.58E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	212.64	1.034	1.007	1.45E-06	4.34E-08	0	4.3E-08	0.615	2.08E-09	1.56E-09	1.04E-09	5.20E-10	No
SVOCs/PAHs	Biphenyl	Mid Upper Cook Inlet	1.02E-01	2.19E+03	4.66E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	822	1.253	1.072	4.80E-05	1.44E-06	0	1.4E-06	0.615	6.91E-08	5.18E-08	3.45E-08	1.73E-08	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Mid Upper Cook Inlet	9.50E+01	2.19E+03	4.34E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	6848	11.708	16.749	3.48E+00	1.04E-01	0	1.0E-01	18.3	1.68E-04	1.26E-04	8.41E-05	4.21E-05	No
SVOCs/PAHs	Butyl Benzyl Phthalate	Mid Upper Cook Inlet	5.62E+00	2.19E+03	2.57E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	2454.4	2.175	1.633	1.37E-02	4.11E-04	0	4.1E-04	159	7.63E-08	5.72E-08	3.81E-08	1.91E-08	No
SVOCs/PAHs	Carbazole	Mid Upper Cook Inlet	2.01E-01	2.19E+03	9.18E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	529.2	1.128	1.033

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4										
SVOCs/PAHs	Chrysene/Triphenylene	Mid Upper Cook Inlet	6.14E-02	2.19E+03	2.80E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12660	8.841	12.05	3.14E-03	9.42E-05	0	9.4E-05	0.615	4.52E-06	3.39E-06	2.26E-06	1.13E-06	No
SVOCs/PAHs	cis/trans Decalin	Mid Upper Cook Inlet	4.84E-01	2.19E+03	2.21E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1091.2	1.38	1.13	3.33E-04	9.99E-06	0	1.0E-05	16.68	1.77E-08	1.32E-08	8.83E-09	4.42E-09	No
SVOCs/PAHs	Dibenzo(a,h)anthracene	Mid Upper Cook Inlet	6.68E-03	2.19E+03	3.05E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	38384	13.662	24.604	1.60E-03	4.80E-05	0	4.8E-05	2.66	5.32E-07	3.99E-07	2.66E-07	1.33E-07	No
SVOCs/PAHs	Dibenzofuran	Mid Upper Cook Inlet	6.98E-02	2.19E+03	3.19E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	971.6	1.315	1.096	4.07E-05	1.22E-06	0	1.2E-06	0.615	5.86E-08	4.40E-08	2.93E-08	1.47E-08	No
SVOCs/PAHs	Dibenzothiophene	Mid Upper Cook Inlet	3.35E-02	2.19E+03	1.53E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1442	1.614	1.242	3.56E-05	1.07E-06	0	1.1E-06	1.04	3.03E-08	2.27E-08	1.52E-08	7.58E-09	No
SVOCs/PAHs	Diethyl Phthalate	Mid Upper Cook Inlet	3.70E+00	2.19E+03	1.69E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	73.4	1.01	1.002	1.25E-04	3.76E-06	0	3.8E-06	4600	2.41E-11	1.81E-11	1.21E-11	6.03E-12	No
SVOCs/PAHs	Dimethyl Phthalate	Mid Upper Cook Inlet	1.20E-01	2.19E+03	5.48E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	21.124	1	1	1.16E-06	3.47E-08	0	3.5E-08	68	1.51E-11	1.13E-11	7.54E-12	3.77E-12	No
SVOCs/PAHs	Di-n-butyl Phthalate	Mid Upper Cook Inlet	8.40E-01	2.19E+03	3.84E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1730.4	1.766	1.334	1.17E-03	3.52E-05	0	3.5E-05	1340	7.74E-10	5.81E-10	3.87E-10	1.94E-10	No
SVOCs/PAHs	Di-n-octyl Phthalate	Mid Upper Cook Inlet	1.89E+01	2.19E+03	8.63E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	3895.6	7.278	6.012	2.45E-01	7.34E-03	0	7.3E-03	36.8	5.89E-06	4.42E-06	2.94E-06	1.47E-06	No
SVOCs/PAHs	Fluoranthene	Mid Upper Cook Inlet	3.17E-01	2.19E+03	1.45E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	4716	4.188	3.873	2.86E-03	8.58E-05	0	8.6E-05	125	2.03E-08	1.52E-08	1.01E-08	5.06E-09	No
SVOCs/PAHs	Fluorene	Mid Upper Cook Inlet	1.26E-01	2.19E+03	5.76E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	1064.4	1.38	1.13	8.45E-05	2.54E-06	0	2.5E-06	125	5.99E-10	4.49E-10	2.99E-10	1.50E-10	No
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	Mid Upper Cook Inlet	4.44E-02	2.19E+03	2.03E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	48720	14.223	26.363	1.41E-02	4.22E-04	0	4.2E-04	7.2	1.73E-06	1.30E-06	8.64E-07	4.32E-07	No
SVOCs/PAHs	Isophorone	Mid Upper Cook Inlet	3.80E-01	2.19E+03	1.74E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	24.588	1	1	4.27E-06	1.28E-07	0	1.3E-07	150	2.52E-11	1.89E-11	1.26E-11	6.30E-12	No
SVOCs/PAHs	Naphthalene	Mid Upper Cook Inlet	9.80E-01	2.19E+03	4.48E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	279.52	1.053	1.012	1.32E-04	3.95E-06	0	4.0E-06	71	1.64E-09	1.23E-09	8.21E-10	4.11E-10	No
SVOCs/PAHs	Naphthobenzothiophene	Mid Upper Cook Inlet	3.37E-02	2.19E+03	1.54E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	4936	4.188	3.873	3.18E-04	9.55E-06	0	9.5E-06	0.615	4.58E-07	3.43E-07	2.29E-07	1.14E-07	No
SVOCs/PAHs	N-Nitrosodimethylamine	Mid Upper Cook Inlet	9.60E+00	2.19E+03	4.39E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	5.55E-05	1.66E-06	0	1.7E-06	0.005	9.82E-06	7.36E-06	4.91E-06	2.45E-06	No
SVOCs/PAHs	Pentachlorophenol (PCP)	Mid Upper Cook Inlet	6.30E+00	2.19E+03	2.88E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	4440	3.643	3.162	4.66E-02	1.40E-03	0	1.4E-03	8.42	4.89E-06	3.67E-06	2.45E-06	1.22E-06	No
SVOCs/PAHs	Perylene	Mid Upper Cook Inlet	3.33E-02	2.19E+03	1.52E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	24708	12.691	21.677	4.77E-03	1.43E-04	0	1.4E-04	0.615	6.86E-06	5.15E-06	3.43E-06	1.72E-06	No
SVOCs/PAHs	Phenanthrene	Mid Upper Cook Inlet	9.80E-01	2.19E+03	4.48E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	7460	1.766	1.334	5.90E-03	1.77E-04	0	1.8E-04	65.6	7.96E-08	5.97E-08	3.98E-08	1.99E-08	No
SVOCs/PAHs	Phenol	Mid Upper Cook Inlet	5.45E+01	2.19E+03	2.49E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	17.076	1	1	4.25E-04	1.28E-05	0	1.3E-05	60	6.27E-09	4.70E-09	3.14E-09	1.57E-09	No
SVOCs/PAHs	Pyrene	Mid Upper Cook Inlet	4.70E-01	2.19E+03	2.15E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	3082.4	2.78	2.193	1.84E-03	5.52E-05	0	5.5E-05	0.615	2.65E-06	1.99E-06	1.32E-06	6.62E-07	No
SVOCs/PAHs	Retene	Mid Upper Cook Inlet	1.08E-02	2.19E+03	4.93E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	131400	12.691	21.677	8.23E-03	2.47E-04	0	2.5E-04	65.6	1.11E-07	8.32E-08	5.55E-08	2.77E-08	No
Tetracycline antibiotic	Doxycycline	Mid Upper Cook Inlet	1.50E-01	2.19E+03	6.85E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	8.67E-07	2.60E-08	0	2.6E-08	4.0298	1.90E-10	1.43E-10	9.52E-11	4.76E-11	No
Tetracycline antibiotic	Tetracycline [TC]	Mid Upper Cook Inlet	9.79E-02	2.19E+03	4.47E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	5.66E-07	1.70E-08	0	1.7E-08	6.4	7.82E-11	5.87E-11	3.91E-11	1.96E-11	No
Tranquilizer	Meprobamate	Mid Upper Cook Inlet	3.83E-01	2.19E+03	1.75E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	2.21E-06	6.64E-08	0	6.6E-08	3	6.53E-10	4.90E-10	3.26E-10	1.63E-10	No
Urinary steroid	Androsterone	Mid Upper Cook Inlet	5.71E-02	2.19E+03	2.61E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	505.6	1.128	1.033	1.49E-05	4.46E-07	0	4.5E-07	200	6.58E-11	4.94E-11	3.29E-11	1.65E-11	No
VOCs	1,1,1-Trichloroethane (TCA)	Mid Upper Cook Inlet	7.90E-01	2.19E+03	3.61E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	81.64	1.01	1.002	2.98E-05	8.93E-07	0	8.9E-07	999	2.64E-11	1.98E-11	1.32E-11	6.59E-12	No
VOCs	1,2-Dichloroethane (EDC)	Mid Upper Cook Inlet	8.00E-02	2.19E+03	3.65E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	17.604	1	1	6.43E-07	1.93E-08	0	1.9E-08	382	1.49E-12	1.12E-12	7.45E-13	3.73E-13	No
VOCs	1,4-Dichlorobenzene	Mid Upper Cook Inlet	8.40E-01	2.19E+03	3.84E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	345.76	1.067	1.014	1.42E-04	4.25E-06	0	4.2E-06	2.5	5.01E-08	3.76E-08	2.51E-08	1.25E-08	No
VOCs	2-Butanone (MEK)	Mid Upper Cook Inlet	6.80E+01	2.19E+03	3.11E-02	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	3.93E-04	1.18E-05	0	1.2E-05	1771	1.96E-10	1.47E-10	9.82E-11	4.91E-11	No
VOCs	2-Hexanone	Mid Upper Cook Inlet	5.70E+00	2.19E+03	2.60E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	15.12	1	1	3.94E-05	1.18E-06	0	1.2E-06	8.27	4.21E-09	3.16E-09	2.11E-09	1.05E-09	No
VOCs	Acetone	Mid Upper Cook Inlet	3.00E+02	2.19E+03	1.37E-01	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	1.73E-03	5.20E-05	0	5.2E-05	20	7.67E-08	5.75E-08	3.84E-08	1.92E-08	No
VOCs	Acrolein	Mid Upper Cook Inlet	1.30E+00	2.19E+03	5.94E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	7.51E-06	2.25E-07	0	2.3E-07	0.05	1.33E-07	9.97E-08	6.65E-08	3.32E-08	No
VOCs	Benzene	Mid Upper Cook Inlet	7.80E-01	2.19E+03	3.56E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	47.24	1.005	1	1.69E-05	5.08E-07	0	5.1E-07	26.36	5.68E-10	4.26E-10	2.84E-10	1.42E-10	No
VOCs	Bromodichloromethane	Mid Upper Cook Inlet	8.00E-02	2.19E+03	3.65E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	38.784	1.005	1	1.42E-06	4.27E-08	0	4.3E-08	3.58	3.52E-10	2.64E-10	1.76E-10	8.80E-11	No
VOCs	Bromomethane	Mid Upper Cook Inlet	9.00E-02	2.19E+03	4.11E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	11.328	1	1	4.66E-07	1.40E-08	0	1.4E-08	0.284	1.45E-09	1.09E-09	7.26E-10	3.63E-10	No
VOCs	Carbon Disulfide	Mid Upper Cook Inlet	7.00E-01	2.19E+03	3.20E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	35.404	1	1	1.13E-05	3.40E-07	0	3.4E-07	11	9.11E-10	6.83E-10	4.55E-10	2.28E-10	No
VOCs	Chlorobenzene	Mid Upper Cook Inlet	8.00E-02	2.19E+03	3.65E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	138.96	1.028	1.007	5.22E-06	1.57E-07	0	1.6E-07	19	2.43E-10	1.82E-10	1.22E-10	6.08E-11	No
VOCs	Chloroethane	Mid Upper Cook Inlet	6.90E-01	2.19E+03	3.15E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	16.316	1	1	5.14E-06	1.54E-07	0	1.5E-07	--	--	--	--	--	Uncertainty
VOCs	Chloroform	Mid Upper Cook Inlet	3.95E+00	2.19E+03	1.80E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	37.056	1	1	6.69E-05	2.01E-06	0	2.0E-06	2.58	2.29E-08	1.72E-08	1.15E-08	5.73E-09	No
VOCs	Chloromethane	Mid Upper Cook Inlet	1.90E+00	2.19E+03	8.68E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.648	1	1	1.10E-05	3.29E-07	0	3.3E-07	3.2	3.04E-09	2.28E-09	1.52E-09	7.59E-10	No
VOCs	cis-1,2-Dichloroethene	Mid Upper Cook Inlet	7.00E-02	2.19E+03	3.20E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	38.784	1.005	1	1.25E-06	3.74E-08	0	3.7E-08	90.4	1.22E-11	9.15E-12	6.10E-12	3.05E-12	No
VOCs	Dichloromethane (Methylene Chlori	Mid Upper Cook Inlet	6.85E+00	2.19E+03	3.13E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	12.412	1	1	3.88E-05	1.17E-06	0	1.2E-06	5.85	5.88E-09	4.41E-09	2.94E-09	1.47E-09	No
VOCs	Ethylbenzene	Mid Upper Cook Inlet	1.50E+00	2.19E+03	6.85E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	222.56	1.042	1.009	1.59E-04	4.77E-06	0	4.8E-06	97.1	1.45E-09	1.09E-09	7.24E-10	3.62E-10	No
VOCs	m,p-Xylenes	Mid Upper Cook Inlet	6.20E+00	2.19E+03	2.83E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	226	1.042	1.009	6.67E-04	2.00E-05	0	2.0E-05	2.1	2.81E-07	2.11E-07	1.41E-07	7.03E-08	No
VOCs	o-Xylene	Mid Upper Cook Inlet	2.60E+00	2.19E+03	1.19E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	225.96	1.042	1.009	2.80E-04	8.39E-06	0	8.4E-06	2.1	1.18E-07	8.84E-08	5.89E-08	2.95E-08	No
VOCs	Styrene	Mid Upper Cook Inlet	5.50E+00	2.19E+03	2.51E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	164.24	1.028	1.007	4.24E-04	1.27E-05	0	1.3E-05	200	1.88E-09	1.41E-09	9.39E-10	4.69E-10	No
VOCs	Tetrachloroethene (PCE)	Mid Upper Cook Inlet	6.00E-01	2.19E+03	2.74E-04	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	325.36	1.067	1.014	9.52E-05	2.85E-06	0	2.9E-06	63	1.34E-09	1.00E-09	6.68E-10	3.34E-10	No
VOCs	Toluene	Mid Upper Cook Inlet	1.60E+01	2.19E+03	7.31E-03	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	117.56	1.01	1.002	8.68E-04	2.60E-05	0	2.6E-05	26	2.95E-08	2.22E-08	1.48E-08	7.39E-09	No
VOCs	Trichloroethene (TCE)	Mid Upper Cook Inlet	7.00E-02	2.19E+03	3.20E-05	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	73.4	1.01	1.002	2.37E-06	7.11E-08	0	7.1E-08	2.8	7.49E-10	5.62E-10	3.75E-10	1.87E-10	No
VOCs	Vinyl Chloride	Mid Upper Cook Inlet	2.00E-02	2.19E+03	9.14E-06	Beluga Whale	1428	0.03	0	0.0295	1	1	0	model	21.884	1	1	2.00E-07	6.00E-09	0	6.0E-09	0.17	1.04E-09	7.81E-10	5.20E-10	2.60E-10	No
Metals	Antimony	Mid Upper Cook Inlet	9.04E-01	2.19E+03	4.13E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	4	1	1	1.65E-06	1.32E-07	0	1.3E-07	0.059	2.24E-06	1.68E-06	1.12E-06	5.60E-07	No
Metals	Arsenic	Mid Upper Cook Inlet	3.42E+00	2.19E+03	1.56E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	176	1	1	2.75E-04	2.20E-05	0	2.2E-05	1.04	2.12E-05	1.59E-05	1.06E-05	5.29E-06	No
Metals	Beryllium	Mid Upper Cook Inlet	1.80E-02	2.19E+03	8.22E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	76	1	1	6.25E-07	5.00E-08	0	5.0E-08	0.532	9.40E-08	7.05E-08	4.70E-08	2.35E-08	No
Metals	Cadmium	Mid Upper Cook Inlet	3.09E-01	2.19E+03	1.41E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	152	1	1	2.15E-05	1.72E-06	0	1.7E-06	0.77	2.23E-06	1.67E-06	1.11E-06	5.57E-07	No
Metals	Chromium	Mid Upper Cook Inlet	3.46E+00	2.19E+03	1.58E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	64	1	1	1.01E-04	8.09E-06	0	8.1E-06	2.4	3.37E-06	2.53E-06	1.69E-06	8.43E-07	No
Metals	Copper	Mid Upper Cook Inlet	1.15E+02	2.19E+03	5.25E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	144	1	1	7.57E-03	6.05E-04	0	6.1E-04	5.6	1.08E-04	8.11E-05	5.40E-05	2.70E-05	No
Metals	Dissolved Antimony	Mid Upper Cook Inlet	8.06E-01	2.19E+03	3.68E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	4	1	1	1.47E-06	1.18E-07	0	1.2E-07	0.059	2.00E-06	1.50E-06	9.99E-07	4.99E-07	No
Metals	Dissolved Arsenic	Mid Upper Cook Inlet	2.78E+00	2.19E+03	1.27E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	176	1	1	2.24E-04	1.79E-05	0	1.8E-05	1.04	1.72E-05	1.29E-05	8.60E-06	4.30E-06	No
Metals	Dissolved Beryllium	Mid Upper Cook Inlet	4.00E-03	2.19E+03	1.83E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	76	1	1	1.39E-07	1.11E-08	0	1.1E-08	0.532	2.09E-08	1.57E-08	1.04E-08	5.22E-09	No
Metals	Dissolved Cadmium	Mid Upper Cook Inlet	2.10E-01	2.19E+03	9.59E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	152	1	1	1.46E-05	1.17E-06	0	1.2E-06	0.77	1.52E-06	1.14E-06	7.58E-07	3.79E-07	No
Metals	Dissolved Chromium	Mid Upper Cook Inlet	3.63E+00	2.19E+03	1.66E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	64	1	1	1.06E-04	8.49E-06	0	8.5E-06	2.4	3.54E-06	2.65E-06	1.77E-06	8.84E-07	No
Metals	Dissolved Copper	Mid Upper Cook Inlet	4.18E+01	2.19E+03	1.91E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	144	1	1	2.75E-03	2.20E-04	0	2.2E-04	5.6	3.93E-05	2.95E-05	1.96E-05	9.82E-06	No
Metals	Dissolved Lead	Mid Upper Cook Inlet	1.54E+00	2.19E+03	7.04E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	8.90E-06	7.12E-07	0	7.1E-07	4.7	1.51E-07	1.14E-07	7.57E-08	3.79E-08	No
Metals	Dissolved Mercury	Mid Upper Cook Inlet	8.94E-02	2.19E+03	4.08E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	25036	2.52	12.6	2.58E-03	2.06E-04	0	2.1E-04	1.41	1.46E-04	1.10E-04	7.31E-05	3.65E-05	No
Metals	Dissolved Molybdenum	Mid Upper Cook Inlet	4.76E+01	2.19E+03	2.17E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.75E-04	2.20E-05	0	2.2E-05	0.52	4.23E-05	3.17E-05	2.12E-05	1.06E-05	No
Metals	Dissolved Nickel	Mid Upper Cook Inlet	9.49E+00	2.19E+03	4.34E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	188	1	1	8.15E-04	6.52E-05	0	6.5E-05	1.7	3.84E-05	2.88E-05	1.92E-05	9.59E-06	No
Metals	Dissolved Selenium	Mid Upper Cook Inlet	1.00E+00	2.19E+03	4.57E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	5.78E-06	4.62E-07	0	4.6E-07	0.143	3.23E-06	2.42E-06	1.62E-06	8.08E-07	No
Metals	Dissolved Silver	Mid Upper Cook Inlet	4.22E-01	2.19E+03	1.93E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.44E-06	1.95E-07	0	2.0E-07	6.02	3.24E-08	2.43E-08	1.62E-08	8.10E-09	No
Metals	Dissolved Thallium	Mid Upper Cook Inlet	3.20E-02	2.19E+03	1.46E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.85E-07	1.48E-08	0	1.5E-08	0.096	1.54E-07	1.16E-07	7.70E-08	3.85E-08	No
Metals	Dissolved Zinc	Mid Upper Cook Inlet	1.24E+02	2.19E+03	5.66E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	188	1	1	1.06E-02	8.52E-04	0	8.5E-04	75.4	1.13E-05	8.47E-06	5.65E-06	2.82E-06	No
Metals	Lead	Mid Upper Cook Inlet	4.80E+00	2.19E+03	2.19E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.77E-05	2.22E-06	0	2.2E-06	4.7	4.72E-07	3.54E-07	2.36E-07	1.18E-07	No
Metals	Mercury	Mid Upper Cook Inlet	1.14E-01	2.19E+03	5.21E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	25036	2.52	12.6	3.29E-03	2.63E-04	0	2.6E-04	1.41	1.86E-04	1.40E-04	9.32E-05	4.66E-05	No
Metals	Molybdenum	Mid Upper Cook Inlet	4.87E+01	2.19E+03	2.22E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.81E-04	2.25E-05	0	2.3E-05	0.52	4.33E-05	3.25E-05	2.16E-05	1.08E-05	No
Metals	Nickel	Mid Upper Cook Inlet	6.70E+00	2.19E+03	3.06E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	188	1	1	5.75E-04	4.60E-05	0	4.6E-05	1.7	2.71E-05	2.03E-05	1.35E-05	6.77E-06	No
Metals	Selenium	Mid Upper Cook Inlet	1.20E+00	2.19E+03	5.48E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	19.52	1	1	1.07E-05	8.56E-07	0	8.6E-07	0.143	5.99E-06	4.49E-06	2.99E-06	1.50E-06	No
Metals	Silver	Mid Upper Cook Inlet	4.90E-01	2.19E+03	2.24E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2	1	1	4.48E-07	3.58E-08	0	3.6E-08	6.02	5.95E-09	4.46E-09	2.97E-09	1.49E-09	No
Metals	Thallium	Mid Upper Cook Inlet	5.20E-02	2.19E+03	2.38E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	464	1	1	1.10E-05	8.82E-07	0	8.8E-07	0.096	9.19E-06	6.89E-06	4.59E-06	2.30E-06	No
Metals	Zinc	Mid Upper Cook Inlet	1.65E+02	2.19E+03	7.54E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	188	1	1	1.42E-02	1.13E-03	0	1.1E-03	75.4	1.50E-05	1.13E-05	7.52E-06	3.76E-06	No
Cyanide	Cyanide, Total	Mid Upper Cook Inlet	9.00E+00	2.19E+03	4.11E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	5.20E-05	4.16E-06	0	4.2E-06	0.38	1.09E-05	8.21E-06	5.47E-06	2.74E-06	No

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Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
ACE inhibitor	Enalapril	Mid Upper Cook Inlet	1.21E-02	2.19E+03	5.53E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	6.99E-08	5.59E-09	0	5.6E-09	8	6.99E-10	5.24E-10	3.50E-10	1.75E-10	No
Ammonia	Total Ammonia	Mid Upper Cook Inlet	3.30E+04	2.19E+03	1.51E+01	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.91E-01	1.53E-02	0	1.5E-02	--	--	--	--	--	Uncertainty
Anabolic agent	Androstenedione	Mid Upper Cook Inlet	1.62E-01	2.19E+03	7.40E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	121.2	1.028	1.007	9.22E-06	7.38E-07	0	7.4E-07	12	6.15E-08	4.61E-08	3.07E-08	1.54E-08	No
Analgesic	Ibuprofen	Mid Upper Cook Inlet	2.09E+01	2.19E+03	9.55E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.253	1.072	1.51E-04	1.21E-05	0	1.2E-05	1.98	6.11E-06	4.59E-06	3.06E-06	1.53E-06	No
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	Mid Upper Cook Inlet	3.87E+01	2.19E+03	1.77E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.01	1.002	2.26E-04	1.81E-05	0	1.8E-05	5.02	3.60E-06	2.70E-06	1.80E-06	9.00E-07	No
Anti-acid reflux	Ranitidine	Mid Upper Cook Inlet	8.44E-02	2.19E+03	3.86E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	4.88E-07	3.90E-08	0	3.9E-08	--	--	--	--	--	Uncertainty
Antiasthmatic	Albuterol	Mid Upper Cook Inlet	2.01E-02	2.19E+03	9.18E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.16E-07	9.29E-09	0	9.3E-09	8	1.16E-09	8.71E-10	5.81E-10	2.90E-10	No
Antiasthmatic	Theophylline	Mid Upper Cook Inlet	5.11E+01	2.19E+03	2.33E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.95E-04	2.36E-05	0	2.4E-05	0.9	2.62E-05	1.97E-05	1.31E-05	6.56E-06	No
Antibacterial	Penicillin V	Mid Upper Cook Inlet	1.34E-02	2.19E+03	6.12E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.005	1	7.78E-08	6.22E-09	0	6.2E-09	14	4.45E-10	3.33E-10	2.22E-10	1.11E-10	No
Antibiotic	4-Epitetracycline [ETC]	Mid Upper Cook Inlet	6.62E-02	2.19E+03	3.02E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	3.83E-07	3.06E-08	0	3.1E-08	6.4	4.78E-09	3.59E-09	2.39E-09	1.20E-09	No
Antibiotic	Enrofloxacin	Mid Upper Cook Inlet	7.08E-04	2.19E+03	3.23E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	4.09E-09	3.27E-10	0	3.3E-10	2	1.64E-10	1.23E-10	8.18E-11	4.09E-11	No
Anticonvulsant	Benztropine	Mid Upper Cook Inlet	1.05E-03	2.19E+03	4.80E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1245.2	1.491	1.178	8.91E-07	7.12E-08	0	7.1E-08	0.1	7.12E-07	5.34E-07	3.56E-07	1.78E-07	No
Anticonvulsant	Carbamazepine	Mid Upper Cook Inlet	5.06E-01	2.19E+03	2.31E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	76.84	1.01	1.002	1.79E-05	1.44E-06	0	1.4E-06	2.116	6.78E-07	5.09E-07	3.39E-07	1.70E-07	No
Antidepressant	10-hydroxy-amitriptyline	Mid Upper Cook Inlet	1.92E-02	2.19E+03	8.77E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	330.56	1.067	1.014	3.09E-06	2.47E-07	0	2.5E-07	--	--	--	--	--	Uncertainty
Antidepressant	Amitriptyline	Mid Upper Cook Inlet	7.46E-02	2.19E+03	3.41E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3275.6	2.78	2.193	3.10E-04	2.48E-05	0	2.5E-05	0.28	8.87E-05	6.65E-05	4.43E-05	2.22E-05	No
Antidiabetic drug	Glipizide	Mid Upper Cook Inlet	1.07E-02	2.19E+03	4.89E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	33.828	1	1	1.65E-07	1.32E-08	0	1.3E-08	--	--	--	--	--	Uncertainty
Antidiabetic drug	Glyburide	Mid Upper Cook Inlet	1.85E-02	2.19E+03	8.45E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2689.2	2.452	1.871	5.57E-05	4.46E-06	0	4.5E-06	13	3.43E-07	2.57E-07	1.71E-07	8.57E-08	No
Antidiabetic drug	Metformin	Mid Upper Cook Inlet	8.93E+01	2.19E+03	4.08E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	5.16E-04	4.13E-05	0	4.1E-05	0.92	4.49E-05	3.37E-05	2.24E-05	1.12E-05	No
Antifungal agent	Miconazole	Mid Upper Cook Inlet	5.62E-02	2.19E+03	2.57E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	24768	12.691	21.677	8.07E-03	6.46E-04	0	6.5E-04	2.076	3.11E-04	2.33E-04	1.55E-04	7.77E-05	No
Antihistamine	Diphenhydramine	Mid Upper Cook Inlet	1.68E+00	2.19E+03	7.67E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	267.04	1.053	1.012	2.16E-04	1.73E-05	0	1.7E-05	2	8.63E-06	6.47E-06	4.32E-06	2.16E-06	No
Antihistamine	Promethazine	Mid Upper Cook Inlet	3.35E-02	2.19E+03	1.53E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2771.2	2.452	1.871	1.04E-04	8.32E-06	0	8.3E-06	0.22	3.78E-05	2.84E-05	1.89E-05	9.45E-06	No
Antihypertensive	Diltiazem	Mid Upper Cook Inlet	4.06E-01	2.19E+03	1.85E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	112.32	1.01	1.002	2.10E-05	1.68E-06	0	1.7E-06	2.96	5.69E-07	4.26E-07	2.84E-07	1.42E-07	No
Antihypertensive	Valsartan	Mid Upper Cook Inlet	1.58E+01	2.19E+03	7.22E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	400	1.128	1.033	3.26E-03	2.61E-04	0	2.6E-04	--	--	--	--	--	Uncertainty
Antihypertensive	Verapamil	Mid Upper Cook Inlet	5.12E-02	2.19E+03	2.34E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	588.4	1.161	1.042	1.60E-05	1.28E-06	0	1.3E-06	0.456	2.80E-06	2.10E-06	1.40E-06	7.01E-07	No
Antilipemic	Gemfibrozil	Mid Upper Cook Inlet	1.33E+00	2.19E+03	6.08E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	2.452	1.871	1.88E-05	1.51E-06	0	1.5E-06	12.648	1.19E-07	8.94E-08	5.96E-08	2.98E-08	No
Antimicrobial, disinfectant	Triclocarban	Mid Upper Cook Inlet	4.89E-03	2.19E+03	2.23E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3186	2.78	2.193	1.98E-05	1.58E-06	0	1.6E-06	138.4	1.14E-08	8.58E-09	5.72E-09	2.86E-09	No
Antimicrobial, disinfectant	Triclosan	Mid Upper Cook Inlet	4.31E+00	2.19E+03	1.97E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2568.8	2.452	1.871	1.24E-02	9.92E-04	0	9.9E-04	6	1.65E-04	1.24E-04	8.27E-05	4.13E-05	No
Antipyretic, analgesic	Acetaminophen	Mid Upper Cook Inlet	1.22E+02	2.19E+03	5.57E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	7.05E-04	5.64E-05	0	5.6E-05	66.66	8.46E-07	6.34E-07	4.23E-07	2.11E-07	No
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	Mid Upper Cook Inlet	5.78E+01	2.19E+03	2.64E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	3.34E-04	2.67E-05	0	2.7E-05	--	--	--	--	--	Uncertainty
Betablocker	Atenolol	Mid Upper Cook Inlet	1.88E+00	2.19E+03	8.59E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.09E-05	8.69E-07	0	8.7E-07	8	1.09E-07	8.15E-08	5.43E-08	2.72E-08	No
Betablocker	Metoprolol	Mid Upper Cook Inlet	4.89E-01	2.19E+03	2.23E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	17.944	1	1	4.01E-06	3.21E-07	0	3.2E-07	4.632	6.92E-08	5.19E-08	3.46E-08	1.73E-08	No
Betablocker	Propranolol	Mid Upper Cook Inlet	7.48E-02	2.19E+03	3.42E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	203.96	1.083	1.019	7.55E-06	6.04E-07	0	6.0E-07	1.28	4.72E-07	3.54E-07	2.36E-07	1.18E-07	No
BloodThinner	Warfarin	Mid Upper Cook Inlet	4.03E-03	2.19E+03	1.84E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	112.32	1.01	1.002	2.09E-07	1.67E-08	0	1.7E-08	0.0064	2.61E-06	1.96E-06	1.31E-06	6.53E-07	No
ChannelBlocker	Amlodipine	Mid Upper Cook Inlet	2.48E-02	2.19E+03	1.13E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	177.2	1.028	1.007	2.06E-06	1.65E-07	0	1.7E-07	2	8.26E-08	6.19E-08	4.13E-08	2.06E-08	No
ChannelBlocker	Dehydronifedipine	Mid Upper Cook Inlet	1.40E-03	2.19E+03	6.40E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	222.96	1.042	1.009	1.49E-07	1.19E-08	0	1.2E-08	--	--	--	--	--	Uncertainty
ChannelBlocker	Desmethyldiltiazem	Mid Upper Cook Inlet	8.36E-02	2.19E+03	3.82E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	112.32	1.01	1.002	4.33E-06	3.47E-07	0	3.5E-07	--	--	--	--	--	Uncertainty
ChannelBlocker	Norverapamil	Mid Upper Cook Inlet	1.89E-02	2.19E+03	8.63E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1970.4	1.95	1.459	3.32E-05	2.65E-06	0	2.7E-06	0.032	8.29E-05	6.22E-05	4.15E-05	2.07E-05	No
Cocaine metabolite	Benzoylecgonine	Mid Upper Cook Inlet	1.96E+00	2.19E+03	8.95E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.13E-05	9.06E-07	0	9.1E-07	0.3804	2.38E-06	1.79E-06	1.19E-06	5.95E-07	No
Contraceptive	Norgestrel	Mid Upper Cook Inlet	8.18E-02	2.19E+03	3.74E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	367.32	1.083	1.019	1.49E-05	1.19E-06	0	1.2E-06	20.04	5.93E-08	4.45E-08	2.97E-08	1.48E-08	No
Corticosteroid	Hydrocortisone	Mid Upper Cook Inlet	7.82E-01	2.19E+03	3.57E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	21.444	1	1	7.66E-06	6.13E-07	0	6.1E-07	0.6	1.02E-06	7.66E-07	5.11E-07	2.55E-07	No
Depressant	Alprazolam	Mid Upper Cook Inlet	3.23E-03	2.19E+03	1.48E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	46.56	1.005	1	6.90E-08	5.52E-09	0	5.5E-09	2.16	2.56E-09	1.92E-09	1.28E-09	6.39E-10	No
Depressant	Diazepam	Mid Upper Cook Inlet	8.27E-04	2.19E+03	3.78E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	134.8	1.028	1.007	5.24E-08	4.19E-09	0	4.2E-09	1.112	3.77E-09	2.82E-09	1.88E-09	9.42E-10	No
Diuretic	Furosemide	Mid Upper Cook Inlet	2.08E-01	2.19E+03	9.50E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.005	1	1.21E-06	9.66E-08	0	9.7E-08	10.4	9.29E-09	6.97E-09	4.65E-09	2.32E-09	No
Diuretic	Hydrochlorothiazide	Mid Upper Cook Inlet	1.07E+00	2.19E+03	4.89E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	6.18E-06	4.95E-07	0	4.9E-07	12.32	4.01E-08	3.01E-08	2.01E-08	1.00E-08	No
Diuretic	Triamterene	Mid Upper Cook Inlet	9.41E-02	2.19E+03	4.30E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	5.44E-07	4.35E-08	0	4.3E-08	1.6	2.72E-08	2.04E-08	1.36E-08	6.80E-09	No
Fungicide and parasiticide	Thiabendazole	Mid Upper Cook Inlet	3.06E-02	2.19E+03	1.40E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	79.2	1.01	1.002	1.12E-06	8.95E-08	0	8.9E-08	5.2	1.72E-08	1.29E-08	8.60E-09	4.30E-09	No
Glycoside	Digoxin	Mid Upper Cook Inlet	7.01E-02	2.19E+03	3.20E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.6	1	1	4.03E-07	3.23E-08	0	3.2E-08	0.07112	4.54E-07	3.40E-07	2.27E-07	1.13E-07	No
Lincosamide antibiotic	Lincomycin	Mid Upper Cook Inlet	4.35E-02	2.19E+03	1.99E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.51E-07	2.01E-08	0	2.0E-08	3.132	6.42E-09	4.81E-09	3.21E-09	1.60E-09	No
Macrolide antibiotic	Azithromycin	Mid Upper Cook Inlet	3.41E-01	2.19E+03	1.56E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	834.4	1.253	1.072	1.63E-04	1.30E-05	0	1.3E-05	12	1.09E-06	8.14E-07	5.43E-07	2.71E-07	No
Macrolide antibiotic	Clarithromycin	Mid Upper Cook Inlet	1.65E-01	2.19E+03	7.54E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	225.96	1.042	1.009	1.77E-05	1.42E-06	0	1.4E-06	5.08	2.79E-07	2.10E-07	1.40E-07	6.99E-08	No
Macrolide antibiotic	Erythromycin-H2O	Mid Upper Cook Inlet	1.68E-01	2.19E+03	7.67E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	194.12	1.034	1.007	1.54E-05	1.23E-06	0	1.2E-06	10.32	1.19E-07	8.96E-08	5.97E-08	2.99E-08	No
Macrolide antibiotic	Roxithromycin	Mid Upper Cook Inlet	9.41E-04	2.19E+03	4.30E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	121.36	1.028	1.007	5.36E-08	4.29E-09	0	4.3E-09	0.8	5.36E-09	4.02E-09	2.68E-09	1.34E-09	No
Macrolide antibiotic	Tylosin	Mid Upper Cook Inlet	1.43E-03	2.19E+03	6.53E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	22.108	1	1	1.44E-08	1.16E-09	0	1.2E-09	3.2	3.61E-10	2.71E-10	1.81E-10	9.03E-11	No
Nicotinemetabolite	Cotinine	Mid Upper Cook Inlet	2.80E+00	2.19E+03	1.28E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.62E-05	1.29E-06	0	1.3E-06	6.416	2.02E-07	1.51E-07	1.01E-07	5.04E-08	No
Non-steroidalanti-inflammatory dr	Naproxen	Mid Upper Cook Inlet	1.24E+01	2.19E+03	5.66E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.042	1.009	7.47E-05	5.97E-06	0	6.0E-06	4.936	1.21E-06	9.07E-07	6.05E-07	3.02E-07	No
Oil & Grease	Oil and Grease, Total (HEM)	Mid Upper Cook Inlet	4.27E+04	2.19E+03	1.95E+01	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	0	0	0	0.00E+00	0.00E+00	0	0.0E+00	--	--	--	--	--	Uncertainty
Opiate	Codeine	Mid Upper Cook Inlet	1.52E-01	2.19E+03	6.94E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	11.328	1	1	7.87E-07	6.29E-08	0	6.3E-08	1.708	3.68E-08	2.76E-08	1.84E-08	9.21E-09	No
Opiate	Hydrocodone	Mid Upper Cook Inlet	6.87E-02	2.19E+03	3.14E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	49.8	1.005	1	1.57E-06	1.26E-07	0	1.3E-07	1.5	8.38E-08	6.28E-08	4.19E-08	2.09E-08	No
Opiate	Oxycodone	Mid Upper Cook Inlet	1.60E-01	2.19E+03	7.31E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	9.24E-07	7.40E-08	0	7.4E-08	1.28	5.78E-08	4.33E-08	2.89E-08	1.44E-08	No
Opiod	Propoxyphene	Mid Upper Cook Inlet	1.02E-02	2.19E+03	4.66E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1064.4	1.38	1.13	6.84E-06	5.48E-07	0	5.5E-07	0.54	1.01E-06	7.60E-07	5.07E-07	2.53E-07	No
PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-2	Mid Upper Cook Inlet	2.58E-02	2.19E+03	1.18E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	166.84	1.493	0.226	2.94E-06	2.35E-07	0	2.3E-07	2.22	1.06E-07	7.93E-08	5.29E-08	2.64E-08	No
PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	Mid Upper Cook Inlet	5.24E-03	2.19E+03	2.39E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	60560	14.355	26.669	2.08E-03	1.66E-04	0	1.7E-04	0.5	3.33E-04	2.50E-04	1.66E-04	8.32E-05	No
PBDEs	2,2',3,4,4',5,5',6-OcBDE	Mid Upper Cook Inlet	1.41E-03	2.19E+03	6.44E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	7728	2.732	0.778	1.36E-05	1.09E-06	0	1.1E-06	0.07	1.55E-05	1.17E-05	7.77E-06	3.89E-06	No
PBDEs	2,2',3,4,4',5',6-HpBDE	Mid Upper Cook Inlet	6.87E-04	2.19E+03	3.14E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3393.2	1.493	0.226	1.59E-06	1.27E-07	0	1.3E-07	0.07	1.82E-06	1.36E-06	9.09E-07	4.54E-07	No
PBDEs	2,2',3,4,4',5'-HxBDE	Mid Upper Cook Inlet	4.94E-04	2.19E+03	2.26E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	9264	3.296	1.146	6.89E-06	5.51E-07	0	5.5E-07	0.07	7.88E-06	5.91E-06	3.94E-06	1.97E-06	No
PBDEs	2,2',3,4,4',6'-HxBDE	Mid Upper Cook Inlet	1.54E-04	2.19E+03	7.04E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	9264	3.296	1.146	2.15E-06	1.72E-07	0	1.7E-07	0.07	2.46E-06	1.84E-06	1.23E-06	6.14E-07	No
PBDEs	2,2',3,4,4'-PeBDE	Mid Upper Cook Inlet	1.82E-03	2.19E+03	8.31E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	25280	10.914	14.388	2.29E-04	1.84E-05	0	1.8E-05	0.07	2.62E-04	1.97E-04	1.31E-04	6.55E-05	No
PBDEs	2,2',4,4',5,5'-HxBDE	Mid Upper Cook Inlet	3.60E-03	2.19E+03	1.64E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	9264	3.296	1.146	5.02E-05	4.02E-06	0	4.0E-06	0.07	5.74E-05	4.30E-05	2.87E-05	1.43E-05	No
PBDEs	2,2',4,4',5,6'-HxBDE	Mid Upper Cook Inlet	3.05E-03	2.19E+03	1.39E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	9264	3.296	1.146	4.25E-05	3.40E-06	0	3.4E-06	0.07	4.86E-05	3.65E-05	2.43E-05	1.22E-05	No
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	Mid Upper Cook Inlet	4.06E-02	2.19E+03	1.85E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	60560	14.355	26.669	1.61E-02	1.29E-03	0	1.3E-03	0.058	2.22E-02	1.67E-02	1.11E-02	5.56E-03	No
PBDEs	2,2',4,4',6,6'-HxBDE	Mid Upper Cook Inlet	2.13E-04	2.19E+03	9.73E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	9264	3.296	1.146	2.97E-06	2.38E-07	0	2.4E-07	0.07	3.40E-06	2.55E-06	1.70E-06	8.49E-07	No
PBDEs	2,2',4,4',6-PeBDE	Mid Upper Cook Inlet	8.11E-03	2.19E+03	3.70E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	25280	10.914	14.388	1.02E-03	8.18E-05	0	8.2E-05	0.07	1.17E-03	8.76E-04	5.84E-04	2.92E-04	No
PBDEs	2,2',4,4'-TeBDE (BDE-47)	Mid Upper Cook Inlet	4.32E-02	2.19E+03	1.97E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	54400	14.355	26.669	1.54E-02	1.23E-03	0	1.2E-03	0.07	1.76E-02	1.32E-02	8.81E-03	4.40E-03	No
PBDEs	2,2',4,5'-TeBDE	Mid Upper Cook Inlet	1.56E-03	2.19E+03	7.13E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	54400	14.355	26.669	5.57E-04	4.45E-05	0	4.5E-05	0.07	6.36E-04	4.77E-04	3.18E-04	1.59E-04	No
PBDEs	2,2',4,6'-TeBDE	Mid Upper Cook Inlet	2.40E-04	2.19E+03	1.10E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	54400	14.355	26.669	8.56E-05	6.85E-06	0	6.8E-06	0.07	9.78E-05	7.34E-05	4.89E-05	2.45E-05	No
PBDEs	2,2',4-TriBDE	Mid Upper Cook Inlet	1.11E-03	2.19E+03	5.07E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	14076	9.716	13.964	6.93E-05	5.55E-06	0	5.5E-06	0.07	7.93E-05	5.94E-05	3.96E-05	1.98E-05	No
PBDEs	2,3',4,4',6-PeBDE	Mid Upper Cook Inlet	2.02E-04	2.19E+03	9.23E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	25280	10.914	14.388	2.55E-05	2.04E-06	0	2.0E-06	0.07	2.91E-05	2.18E-05	1.45E-05	7.27E-06	No
PBDEs	2,3',4,4'-TeBDE	Mid Upper Cook Inlet	1.50E-03	2.19E+03	6.85E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	54400	14.355	26.669	5.35E-04	4.28E-05	0	4.3E-05	0.07	6.12E-04	4.59E-04	3.06E-04	1.53E-04	No
PBDEs	2,3',4',6-TeBDE	Mid Upper Cook Inlet	5.58E-04	2.19E+03	2.55E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	54400	14.355	26.669	1.99E-04	1.59E-05	0	1.6E-05	0.07	2.28E-04	1.71E-04	1.14E-04	5.

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4										
Pesticides	2,4'-DDD	Mid Upper Cook Inlet	1.07E-03	2.19E+03	4.89E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	13944	9.716	13.964	6.62E-05	5.30E-06	0	5.3E-06	0.147	3.60E-05	2.70E-05	1.80E-05	9.01E-06	No
Pesticides	4,4'-DDD	Mid Upper Cook Inlet	2.10E-02	2.19E+03	9.59E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	17420	10.556	15.996	1.76E-03	1.41E-04	0	1.4E-04	0.147	9.60E-04	7.20E-04	4.80E-04	2.40E-04	No
Pesticides	4,4'-DDE	Mid Upper Cook Inlet	4.70E-03	2.19E+03	2.15E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	36672	13.662	24.604	1.08E-03	8.61E-05	0	8.6E-05	0.147	5.85E-04	4.39E-04	2.93E-04	1.46E-04	No
Pesticides	4,4'-DDT	Mid Upper Cook Inlet	1.86E-04	2.19E+03	8.50E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	67360	14.388	26.669	8.24E-05	6.59E-06	0	6.6E-06	0.147	4.48E-05	3.36E-05	2.24E-05	1.12E-05	No
Pesticides	Aldrin	Mid Upper Cook Inlet	9.70E-03	2.19E+03	4.43E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	36120	13.662	24.604	2.19E-03	1.75E-04	0	1.7E-04	0.2	8.75E-04	6.56E-04	4.37E-04	2.19E-04	No
Pesticides	Chlordane, alpha (cis)	Mid Upper Cook Inlet	1.42E-04	2.19E+03	6.49E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	23604	12.064	19.907	1.85E-05	1.48E-06	0	1.5E-06	0.15	9.85E-06	7.39E-06	4.93E-06	2.46E-06	No
Pesticides	Chlorpyriphos	Mid Upper Cook Inlet	9.72E-04	2.19E+03	4.44E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3480.8	3.181	2.612	4.92E-06	3.93E-07	0	3.9E-07	0.1	3.93E-06	2.95E-06	1.97E-06	9.83E-07	No
Pesticides	Chlorpyriphos-Methyl	Mid Upper Cook Inlet	2.11E-04	2.19E+03	9.64E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1296.4	1.491	1.178	1.86E-07	1.49E-08	0	1.5E-08	0.1	1.49E-07	1.12E-07	7.45E-08	3.73E-08	No
Pesticides	Cypermethrin	Mid Upper Cook Inlet	4.05E-03	2.19E+03	1.85E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3881.2	14.388	26.669	1.03E-04	8.27E-06	0	8.3E-06	0.2	4.13E-05	3.10E-05	2.07E-05	1.03E-05	No
Pesticides	DEET	Mid Upper Cook Inlet	6.36E+00	2.19E+03	2.91E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	51	1.005	1	1.49E-04	1.19E-05	0	1.2E-05	1	1.19E-05	8.94E-06	5.96E-06	2.98E-06	No
Pesticides	Demeton-O,S	Mid Upper Cook Inlet	3.80E-02	2.19E+03	1.74E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	38.352	1	1	6.66E-07	5.33E-08	0	5.3E-08	0.008	6.66E-06	4.99E-06	3.33E-06	1.66E-06	No
Pesticides	Dieldrin	Mid Upper Cook Inlet	1.40E-02	2.19E+03	6.40E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	5012	4.188	3.873	1.34E-04	1.07E-05	0	1.1E-05	0.015	7.16E-04	5.37E-04	3.58E-04	1.79E-04	No
Pesticides	Endosulfan Sulfate	Mid Upper Cook Inlet	2.20E-02	2.19E+03	1.01E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	482.8	1.128	1.033	5.47E-06	4.38E-07	0	4.4E-07	0.058	7.55E-06	5.66E-06	3.77E-06	1.89E-06	No
Pesticides	Endrin	Mid Upper Cook Inlet	6.20E-05	2.19E+03	2.83E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	5012	4.188	3.873	5.95E-07	4.76E-08	0	4.8E-08	0.184	2.58E-07	1.94E-07	1.29E-07	6.46E-08	No
Pesticides	Endrin Ketone	Mid Upper Cook Inlet	9.60E-03	2.19E+03	4.39E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3623.2	3.181	2.612	5.05E-05	4.04E-06	0	4.0E-06	0.184	2.20E-05	1.65E-05	1.10E-05	5.49E-06	No
Pesticides	HCH, alpha	Mid Upper Cook Inlet	6.60E-05	2.19E+03	3.02E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1001.6	1.315	1.096	3.97E-08	3.18E-09	0	3.2E-09	87	3.65E-11	2.74E-11	1.83E-11	9.13E-12	No
Pesticides	HCH, beta	Mid Upper Cook Inlet	1.09E-04	2.19E+03	4.98E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1001.6	1.315	1.096	6.56E-08	5.25E-09	0	5.2E-09	0.4	1.31E-08	9.84E-09	6.56E-09	3.28E-09	No
Pesticides	HCH, gamma	Mid Upper Cook Inlet	6.96E-04	2.19E+03	3.18E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1001.6	1.315	1.096	4.19E-07	3.35E-08	0	3.4E-08	0.014	2.39E-06	1.79E-06	1.20E-06	5.98E-07	No
Pesticides	Heptachlor	Mid Upper Cook Inlet	1.40E-02	2.19E+03	6.40E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	7552	6.266	7.079	3.03E-04	2.42E-05	0	2.4E-05	0.2	1.21E-04	9.08E-05	6.05E-05	3.03E-05	No
Pesticides	Hexachlorobenzene	Mid Upper Cook Inlet	5.17E-04	2.19E+03	2.36E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	11212	7.962	10.209	2.11E-05	1.69E-06	0	1.7E-06	7.1	2.38E-07	1.78E-07	1.19E-07	5.94E-08	No
Pesticides	Malathion	Mid Upper Cook Inlet	5.20E-01	2.19E+03	2.38E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	67	1.01	1.002	1.61E-05	1.29E-06	0	1.3E-06	0.046	2.80E-05	2.10E-05	1.40E-05	6.99E-06	No
Pesticides	Methoxychlor	Mid Upper Cook Inlet	2.90E-03	2.19E+03	1.32E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	4176	3.643	3.162	2.02E-05	1.61E-06	0	1.6E-06	1.002	1.61E-06	1.21E-06	8.05E-07	4.02E-07	No
Pesticides	Permethrin	Mid Upper Cook Inlet	4.23E-02	2.19E+03	1.93E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1989.2	13.662	24.604	5.25E-04	4.20E-05	0	4.2E-05	5	8.40E-06	6.30E-06	4.20E-06	2.10E-06	No
PFAS	5:3 FTCA	Mid Upper Cook Inlet	5.92E-02	2.19E+03	2.70E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.766	1.334	6.04E-07	4.83E-08	0	4.8E-08	5	9.67E-09	7.25E-09	4.83E-09	2.42E-09	No
PFAS	PFBA	Mid Upper Cook Inlet	1.49E-02	2.19E+03	6.81E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.005	1	8.65E-08	6.92E-09	0	6.9E-09	35	1.98E-10	1.48E-10	9.89E-11	4.94E-11	No
PFAS	PFHpA	Mid Upper Cook Inlet	8.47E-03	2.19E+03	3.87E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.315	1.096	6.44E-08	5.15E-09	0	5.1E-09	--	--	--	--	--	Uncertainty
PFAS	PFHxA	Mid Upper Cook Inlet	2.55E-02	2.19E+03	1.16E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.083	1.019	1.60E-07	1.28E-08	0	1.3E-08	20	6.38E-10	4.79E-10	3.19E-10	1.60E-10	No
PFAS	PFHxS	Mid Upper Cook Inlet	3.96E-02	2.19E+03	1.81E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.042	1.009	2.38E-07	1.91E-08	0	1.9E-08	5.72	3.33E-09	2.50E-09	1.67E-09	8.34E-10	No
PFAS	PFNA	Mid Upper Cook Inlet	5.14E-03	2.19E+03	2.35E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	40	6.266	7.079	5.89E-07	4.71E-08	0	4.7E-08	0.166	2.84E-07	2.13E-07	1.42E-07	7.09E-08	No
PFAS	PFOA	Mid Upper Cook Inlet	1.85E-02	2.19E+03	8.45E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	2.452	1.871	2.62E-07	2.10E-08	0	2.1E-08	1.75	1.20E-08	8.99E-09	5.99E-09	3.00E-09	No
PFAS	PFOS	Mid Upper Cook Inlet	6.53E-02	2.19E+03	2.98E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.766	1.334	6.66E-07	5.33E-08	0	5.3E-08	0.12	4.44E-07	3.33E-07	2.22E-07	1.11E-07	No
PFAS	PFPeA	Mid Upper Cook Inlet	2.03E-02	2.19E+03	9.27E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.028	1.007	1.21E-07	9.65E-09	0	9.6E-09	--	--	--	--	--	Uncertainty
PFAS	PFPeS	Mid Upper Cook Inlet	3.84E-03	2.19E+03	1.75E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.01	1.002	2.24E-08	1.79E-09	0	1.8E-09	--	--	--	--	--	Uncertainty
Plasticizer	Bisphenol A	Mid Upper Cook Inlet	1.59E+00	2.19E+03	7.26E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	288.12	1.053	1.012	2.20E-04	1.76E-05	0	1.8E-05	10	1.76E-06	1.32E-06	8.81E-07	4.41E-07	No
Plasticizer	Bisphenol S	Mid Upper Cook Inlet	8.88E-01	2.19E+03	4.06E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	22.672	1	1	9.20E-06	7.36E-07	0	7.4E-07	10	7.36E-08	5.52E-08	3.68E-08	1.84E-08	No
Pyrimidine antibiotic	Trimethoprim	Mid Upper Cook Inlet	7.11E-01	2.19E+03	3.25E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	4.11E-06	3.29E-07	0	3.3E-07	0.8	4.11E-07	3.08E-07	2.05E-07	1.03E-07	No
Quinoline antibiotic	Ciprofloxacin	Mid Upper Cook Inlet	3.72E-01	2.19E+03	1.70E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.15E-06	1.72E-07	0	1.7E-07	4	4.30E-08	3.22E-08	2.15E-08	1.07E-08	No
Quinoline antibiotic	Ofloxacin	Mid Upper Cook Inlet	4.27E-01	2.19E+03	1.95E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.47E-06	1.97E-07	0	2.0E-07	2	9.87E-08	7.40E-08	4.93E-08	2.47E-08	No
Rubber Stabilizing compound	6PPD-Quinone	Mid Upper Cook Inlet	5.30E-03	2.19E+03	2.42E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	781.6	1.253	1.072	2.37E-06	1.90E-07	0	1.9E-07	2	9.48E-08	7.11E-08	4.74E-08	2.37E-08	No
Sex hormone	17 beta-Estradiol	Mid Upper Cook Inlet	5.52E-03	2.19E+03	2.52E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	822	1.253	1.072	2.60E-06	2.08E-07	0	2.1E-07	0.01	2.08E-05	1.56E-05	1.04E-05	5.19E-06	No
Sex hormone	Estrone	Mid Upper Cook Inlet	3.31E-02	2.19E+03	1.51E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	215.88	1.034	1.007	3.38E-06	2.70E-07	0	2.7E-07	--	--	--	--	--	Uncertainty
Sex hormone	Progesterone	Mid Upper Cook Inlet	5.66E-02	2.19E+03	2.59E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	664.4	1.202	1.054	2.06E-05	1.65E-06	0	1.7E-06	0.66	2.50E-06	1.88E-06	1.25E-06	6.26E-07	No
Sex hormone	Testosterone	Mid Upper Cook Inlet	7.17E-02	2.19E+03	3.28E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	288.12	1.053	1.012	9.94E-06	7.95E-07	0	7.9E-07	1.72	4.62E-07	3.47E-07	2.31E-07	1.16E-07	No
SSRI Antidepressant	Fluoxetine	Mid Upper Cook Inlet	5.20E-02	2.19E+03	2.38E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	616	1.161	1.042	1.70E-05	1.36E-06	0	1.4E-06	1.136	1.20E-06	8.97E-07	5.98E-07	2.99E-07	No
SSRI Antidepressant	Norfluoxetine	Mid Upper Cook Inlet	2.73E-02	2.19E+03	1.25E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1068	1.38	1.13	1.84E-05	1.47E-06	0	1.5E-06	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Paroxetine	Mid Upper Cook Inlet	1.88E-02	2.19E+03	8.59E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	754.4	1.253	1.072	8.12E-06	6.49E-07	0	6.5E-07	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Sertraline	Mid Upper Cook Inlet	1.08E-01	2.19E+03	4.93E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	5716	4.803	4.742	1.35E-03	1.08E-04	0	1.1E-04	--	--	--	--	--	Uncertainty
Statin	Atorvastatin	Mid Upper Cook Inlet	2.20E-01	2.19E+03	1.01E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	224.92	13.228	23.281	2.99E-04	2.39E-05	0	2.4E-05	20	1.20E-06	8.97E-07	5.98E-07	2.99E-07	No
Steroid	Methylprednisolone	Mid Upper Cook Inlet	1.13E-01	2.19E+03	5.16E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	29.396	1	1	1.52E-06	1.21E-07	0	1.2E-07	8	1.52E-08	1.14E-08	7.59E-09	3.79E-09	No
Steroid	Prednisolone	Mid Upper Cook Inlet	9.31E-03	2.19E+03	4.25E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	21.772	1	1	9.26E-08	7.41E-09	0	7.4E-09	6.72	1.10E-09	8.27E-10	5.51E-10	2.76E-10	No
Steroidal Estrogen	Equilenin	Mid Upper Cook Inlet	1.34E-02	2.19E+03	6.12E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	726.4	1.202	1.054	5.34E-06	4.28E-07	0	4.3E-07	--	--	--	--	--	Uncertainty
Stimulant	Amphetamine	Mid Upper Cook Inlet	5.39E-01	2.19E+03	2.46E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	26.936	1	1	6.63E-06	5.31E-07	0	5.3E-07	0.12	4.42E-06	3.32E-06	2.21E-06	1.11E-06	No
Stimulant	Caffeine	Mid Upper Cook Inlet	1.05E+02	2.19E+03	4.80E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	6.07E-04	4.85E-05	0	4.9E-05	0.508	9.55E-05	7.17E-05	4.78E-05	2.39E-05	No
Stimulant	Cocaine	Mid Upper Cook Inlet	7.68E-01	2.19E+03	3.51E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	61.16	1.01	1.002	2.17E-05	1.73E-06	0	1.7E-06	0.396	4.38E-06	3.28E-06	2.19E-06	1.09E-06	No
Streoid	Prednisone	Mid Upper Cook Inlet	4.04E-01	2.19E+03	1.85E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	17.076	1	1	3.15E-06	2.52E-07	0	2.5E-07	--	--	--	--	--	Uncertainty
Sulfonamide antibiotic	Sulfadiazine	Mid Upper Cook Inlet	1.46E-03	2.19E+03	6.67E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	8.44E-09	6.75E-10	0	6.7E-10	6	1.12E-10	8.44E-11	5.62E-11	2.81E-11	No
Sulfonamide antibiotic	Sulfamethizole	Mid Upper Cook Inlet	5.11E-03	2.19E+03	2.33E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.95E-08	2.36E-09	0	2.4E-09	14	1.69E-10	1.27E-10	8.44E-11	4.22E-11	No
Sulfonamide antibiotic	Sulfamethoxazole	Mid Upper Cook Inlet	1.08E+00	2.19E+03	4.93E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	6.24E-06	4.99E-07	0	5.0E-07	9.2	5.43E-08	4.07E-08	2.71E-08	1.36E-08	No
Sulfonamide antibiotic	Sulfanilamide	Mid Upper Cook Inlet	3.48E-02	2.19E+03	1.59E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.01E-07	1.61E-08	0	1.6E-08	12	1.34E-09	1.01E-09	6.70E-10	3.35E-10	No
SVOCs/PAHs	1,2-Diphenylhydrazine	Mid Upper Cook Inlet	2.50E+00	2.19E+03	1.14E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	161.76	1.028	1.007	1.90E-04	1.52E-05	0	1.5E-05	--	--	--	--	--	Uncertainty
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	Mid Upper Cook Inlet	1.00E-01	2.19E+03	4.57E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2775.2	2.452	1.871	3.11E-04	2.49E-05	0	2.5E-05	65.6	3.79E-07	2.84E-07	1.90E-07	9.48E-08	No
SVOCs/PAHs	1-Methyldibenzothiophene	Mid Upper Cook Inlet	5.00E-02	2.19E+03	2.28E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2390	2.175	1.633	1.19E-04	9.50E-06	0	9.5E-06	65.6	1.45E-07	1.09E-07	7.24E-08	3.62E-08	No
SVOCs/PAHs	1-Methylfluorene	Mid Upper Cook Inlet	5.00E-02	2.19E+03	2.28E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3534	3.181	2.612	2.57E-04	2.05E-05	0	2.1E-05	65.6	3.13E-07	2.35E-07	1.57E-07	7.83E-08	No
SVOCs/PAHs	1-Methylnaphthalene	Mid Upper Cook Inlet	4.27E-01	2.19E+03	1.95E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	664.4	1.202	1.054	1.56E-04	1.25E-05	0	1.2E-05	0.94	1.33E-05	9.94E-06	6.63E-06	3.31E-06	No
SVOCs/PAHs	1-Methylphenanthrene	Mid Upper Cook Inlet	2.85E-02	2.19E+03	1.30E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	19132	3.643	3.162	9.07E-04	7.26E-05	0	7.3E-05	65.6	1.11E-06	8.30E-07	5.53E-07	2.77E-07	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Mid Upper Cook Inlet	1.20E+00	2.19E+03	5.48E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	505.6	1.128	1.033	3.13E-04	2.50E-05	0	2.5E-05	3	8.34E-06	6.25E-06	4.17E-06	2.08E-06	No
SVOCs/PAHs	2,6-Dimethylnaphthalene	Mid Upper Cook Inlet	3.44E-01	2.19E+03	1.57E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1296.4	1.491	1.178	3.04E-04	2.43E-05	0	2.4E-05	65.6	3.70E-07	2.78E-07	1.85E-07	9.26E-08	No
SVOCs/PAHs	2-Methylanthracene	Mid Upper Cook Inlet	6.36E-02	2.19E+03	2.91E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3698.8	3.181	2.612	3.42E-04	2.73E-05	0	2.7E-05	65.6	4.17E-07	3.13E-07	2.08E-07	1.04E-07	No
SVOCs/PAHs	2-Methylfluoranthene	Mid Upper Cook Inlet	1.74E-02	2.19E+03	7.95E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	7672	6.266	7.079	3.82E-04	3.06E-05	0	3.1E-05	65.6	4.66E-07	3.50E-07	2.33E-07	1.17E-07	No
SVOCs/PAHs	2-Methylnaphthalene	Mid Upper Cook Inlet	5.41E-01	2.19E+03	2.47E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	654.4	1.202	1.054	1.94E-04	1.56E-05	0	1.6E-05	65.6	2.37E-07	1.78E-07	1.19E-07	5.93E-08	No
SVOCs/PAHs	2-Methylphenanthrene	Mid Upper Cook Inlet	6.47E-02	2.19E+03	2.96E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	13696	2.78	2.193	1.13E-03	9.00E-05	0	9.0E-05	65.6	1.37E-06	1.03E-06	6.86E-07	3.43E-07	No
SVOCs/PAHs	3,6-Dimethylphenanthrene	Mid Upper Cook Inlet	1.89E-02	2.19E+03	8.63E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	33036	5.502	5.821	1.57E-03	1.26E-04	0	1.3E-04	65.6	1.91E-06	1.44E-06	9.57E-07	4.78E-07	No
SVOCs/PAHs	3-Methylphenanthrene	Mid Upper Cook Inlet	5.79E-02	2.19E+03	2.65E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	13696	2.78	2.193	1.01E-03	8.06E-05	0	8.1E-05	65.6	1.23E-06	9.21E-07	6.14E-07	3.07E-07	No
SVOCs/PAHs	4-Methyldibenzothiophene	Mid Upper Cook Inlet	2.29E-02	2.19E+03	1.05E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2390	2.175	1.633	5.44E-05	4.35E-06	0	4.4E-06	65.6	6.63E-08	4.97E-08	3.32E-08	1.66E-08	No
SVOCs/PAHs	Acenaphthene	Mid Upper Cook Inlet	8.21E-02	2.19E+03	3.75E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	716.8	1.202	1.054	3.23E-05	2.59E-06	0	2.6E-06	65.6	3.94E-08	2.96E-08	1.97E-08	9.85E-09	No
SVOCs/PAHs	Acenaphthylene	Mid Upper Cook Inlet	1.25E-02	2.19E+03	5.71E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	739.2	1.202	1.054	5.07E-06	4.06E-07	0	4.1E-07	65.6	6.19E-09	4.64E-09	3.09E-09	1.55E-09	No
SVOCs/PAHs	Anthracene	Mid Upper Cook Inlet	5.53E-02	2.19E+03	2.53E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1604	1.766	1.334	7.16E-05	5.72E-06	0	5.7E-06	65.6	8.73E-08	6.55E-08	4.36E-08	2.18E-08	No
SVOCs/PAHs	Benz(a)anthracene	Mid Upper Cook Inlet	2.50E-01	2.19E+03	1.14E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	11736	8.841	12.05	1.18E-02	9.48E-04	0	9.5E-04	0.62	1.53E-03	1.15E-03	7.65E-04	3.82E-04	No
SVOCs/PAHs	Benzo(a)fluoranthene	Mid Upper Cook Inlet	1.51E-02	2.19E+03	6.90E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12096	8.841	12.05	7.38E-04	5.90E-05	0	5.9E-05	0.615	9.60E-05	7.20E-05	4.80E-05	2.40E-05	No
SVOCs/PAHs	Benzo(a)pyrene	Mid Upper Cook Inlet	5.63E-02	2.19E+03	2.57E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	20588	11.337

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
SVOCs/PAHs	Benzo(b)fluoranthene	Mid Upper Cook Inlet	4.90E-02	2.19E+03	2.24E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12096	8.841	12.05	2.39E-03	1.92E-04	0	1.9E-04	0.62	3.09E-04	2.32E-04	1.54E-04	7.72E-05	No
SVOCs/PAHs	Benzo(b)fluorene	Mid Upper Cook Inlet	4.06E-02	2.19E+03	1.85E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	11916	8.841	12.05	1.95E-03	1.56E-04	0	1.6E-04	0.615	2.54E-04	1.91E-04	1.27E-04	6.35E-05	No
SVOCs/PAHs	Benzo(e)pyrene	Mid Upper Cook Inlet	5.23E-02	2.19E+03	2.39E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	32976	13.228	23.281	1.04E-02	8.34E-04	0	8.3E-04	0.615	1.36E-03	1.02E-03	6.78E-04	3.39E-04	No
SVOCs/PAHs	Benzo(g,h,i)perylene	Mid Upper Cook Inlet	8.33E-02	2.19E+03	3.81E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	44000	13.98	25.645	2.34E-02	1.87E-03	0	1.9E-03	14.4	1.30E-04	9.75E-05	6.50E-05	3.25E-05	No
SVOCs/PAHs	Benzo(k,j)fluoranthene	Mid Upper Cook Inlet	3.34E-02	2.19E+03	1.53E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	19972	11.337	17.783	3.45E-03	2.76E-04	0	2.8E-04	0.615	4.49E-04	3.37E-04	2.25E-04	1.12E-04	No
SVOCs/PAHs	Benzothiophene	Mid Upper Cook Inlet	1.44E-02	2.19E+03	6.58E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	212.64	1.034	1.007	1.45E-06	1.16E-07	0	1.2E-07	0.615	1.88E-07	1.41E-07	9.41E-08	4.70E-08	No
SVOCs/PAHs	Biphenyl	Mid Upper Cook Inlet	1.02E-01	2.19E+03	4.66E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	822	1.253	1.072	4.80E-05	3.84E-06	0	3.8E-06	0.615	6.24E-06	4.68E-06	3.12E-06	1.56E-06	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Mid Upper Cook Inlet	9.50E+01	2.19E+03	4.34E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	6848	11.708	16.749	3.48E+00	2.78E-01	0	2.8E-01	18.3	1.52E-02	1.14E-02	7.61E-03	3.80E-03	No
SVOCs/PAHs	Butyl Benzyl Phthalate	Mid Upper Cook Inlet	5.62E+00	2.19E+03	2.57E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2454.4	2.175	1.633	1.37E-02	1.10E-03	0	1.1E-03	159	6.90E-06	5.17E-06	3.45E-06	1.72E-06	No
SVOCs/PAHs	Carbazole	Mid Upper Cook Inlet	2.01E-01	2.19E+03	9.18E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	529.2	1.128	1.033	5.48E-05	4.38E-06	0	4.4E-06	0.615	7.13E-06	5.35E-06	3.57E-06	1.78E-06	No
SVOCs/PAHs	Chrysene/Triphenylene	Mid Upper Cook Inlet	6.14E-02	2.19E+03	2.80E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12660	8.841	12.05	3.14E-03	2.51E-04	0	2.5E-04	0.615	4.08E-04	3.06E-04	2.04E-04	1.02E-04	No
SVOCs/PAHs	cis/trans Decalin	Mid Upper Cook Inlet	4.84E-01	2.19E+03	2.21E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1091.2	1.38	1.13	3.33E-04	2.66E-05	0	2.7E-05	16.68	1.60E-06	1.20E-06	7.98E-07	3.99E-07	No
SVOCs/PAHs	Dibenzo(a,h)anthracene	Mid Upper Cook Inlet	6.68E-03	2.19E+03	3.05E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	38384	13.662	24.604	1.60E-03	1.28E-04	0	1.3E-04	2.66	4.81E-05	3.61E-05	2.41E-05	1.20E-05	No
SVOCs/PAHs	Dibenzofuran	Mid Upper Cook Inlet	6.98E-02	2.19E+03	3.19E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	971.6	1.315	1.096	4.07E-05	3.26E-06	0	3.3E-06	0.615	5.30E-06	3.97E-06	2.65E-06	1.32E-06	No
SVOCs/PAHs	Dibenzothiophene	Mid Upper Cook Inlet	3.35E-02	2.19E+03	1.53E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1442	1.614	1.242	3.56E-05	2.85E-06	0	2.8E-06	1.04	2.74E-06	2.05E-06	1.37E-06	6.85E-07	No
SVOCs/PAHs	Diethyl Phthalate	Mid Upper Cook Inlet	3.70E+00	2.19E+03	1.69E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	73.4	1.01	1.002	1.25E-04	1.00E-05	0	1.0E-05	4600	2.18E-09	1.63E-09	1.09E-09	5.45E-10	No
SVOCs/PAHs	Dimethyl Phthalate	Mid Upper Cook Inlet	1.20E-01	2.19E+03	5.48E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	21.124	1	1	1.16E-06	9.26E-08	0	9.3E-08	68	1.36E-09	1.02E-09	6.81E-10	3.41E-10	No
SVOCs/PAHs	Di-n-butyl Phthalate	Mid Upper Cook Inlet	8.40E-01	2.19E+03	3.84E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1730.4	1.766	1.334	1.17E-03	9.38E-05	0	9.4E-05	1340	7.00E-08	5.25E-08	3.50E-08	1.75E-08	No
SVOCs/PAHs	Di-n-octyl Phthalate	Mid Upper Cook Inlet	1.89E+01	2.19E+03	8.63E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3895.6	7.278	6.012	2.45E-01	1.96E-02	0	2.0E-02	36.8	5.32E-04	3.99E-04	2.66E-04	1.33E-04	No
SVOCs/PAHs	Fluoranthene	Mid Upper Cook Inlet	3.17E-01	2.19E+03	1.45E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	4716	4.188	3.873	2.86E-03	2.29E-04	0	2.3E-04	125	1.83E-06	1.37E-06	9.15E-07	4.58E-07	No
SVOCs/PAHs	Fluorene	Mid Upper Cook Inlet	1.26E-01	2.19E+03	5.76E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1064.4	1.38	1.13	8.45E-05	6.76E-06	0	6.8E-06	125	5.41E-08	4.06E-08	2.71E-08	1.35E-08	No
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	Mid Upper Cook Inlet	4.44E-02	2.19E+03	2.03E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	48720	14.223	26.363	1.41E-02	1.12E-03	0	1.1E-03	7.2	1.56E-04	1.17E-04	7.81E-05	3.90E-05	No
SVOCs/PAHs	Isophorone	Mid Upper Cook Inlet	3.80E-01	2.19E+03	1.74E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	24.588	1	1	4.27E-06	3.41E-07	0	3.4E-07	150	2.28E-09	1.71E-09	1.14E-09	5.69E-10	No
SVOCs/PAHs	Naphthalene	Mid Upper Cook Inlet	9.80E-01	2.19E+03	4.48E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	279.52	1.053	1.012	1.32E-04	1.05E-05	0	1.1E-05	71	1.48E-07	1.11E-07	7.42E-08	3.71E-08	No
SVOCs/PAHs	Naphthobenzothiophene	Mid Upper Cook Inlet	3.37E-02	2.19E+03	1.54E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	4936	4.188	3.873	3.18E-04	2.55E-05	0	2.5E-05	0.615	4.14E-05	3.10E-05	2.07E-05	1.03E-05	No
SVOCs/PAHs	N-Nitrosodimethylamine	Mid Upper Cook Inlet	9.60E+00	2.19E+03	4.39E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	5.55E-05	4.44E-06	0	4.4E-06	0.005	8.87E-04	6.66E-04	4.44E-04	2.22E-04	No
SVOCs/PAHs	Pentachlorophenol (PCP)	Mid Upper Cook Inlet	6.30E+00	2.19E+03	2.88E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	4440	3.643	3.162	4.66E-02	3.72E-03	0	3.7E-03	8.42	4.42E-04	3.32E-04	2.21E-04	1.11E-04	No
SVOCs/PAHs	Perylene	Mid Upper Cook Inlet	3.33E-02	2.19E+03	1.52E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	24708	12.691	21.677	4.77E-03	3.82E-04	0	3.8E-04	0.615	6.21E-04	4.65E-04	3.10E-04	1.55E-04	No
SVOCs/PAHs	Phenanthrene	Mid Upper Cook Inlet	9.80E-01	2.19E+03	4.48E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	7460	1.766	1.334	5.90E-03	4.72E-04	0	4.7E-04	65.6	7.19E-06	5.39E-06	3.60E-06	1.80E-06	No
SVOCs/PAHs	Phenol	Mid Upper Cook Inlet	5.45E+01	2.19E+03	2.49E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	17.076	1	1	4.25E-04	3.40E-05	0	3.4E-05	60	5.67E-07	4.25E-07	2.83E-07	1.42E-07	No
SVOCs/PAHs	Pyrene	Mid Upper Cook Inlet	4.70E-01	2.19E+03	2.15E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3082.4	2.78	2.193	1.84E-03	1.47E-04	0	1.5E-04	0.615	2.39E-04	1.79E-04	1.20E-04	5.98E-05	No
SVOCs/PAHs	Retene	Mid Upper Cook Inlet	1.08E-02	2.19E+03	4.93E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	131400	12.691	21.677	8.23E-03	6.58E-04	0	6.6E-04	65.6	1.00E-05	7.53E-06	5.02E-06	2.51E-06	No
Tetracycline antibiotic	Doxycycline	Mid Upper Cook Inlet	1.50E-01	2.19E+03	6.85E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	8.67E-07	6.93E-08	0	6.9E-08	4.0298	1.72E-08	1.29E-08	8.60E-09	4.30E-09	No
Tetracycline antibiotic	Tetracycline [TC]	Mid Upper Cook Inlet	9.79E-02	2.19E+03	4.47E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	5.66E-07	4.53E-08	0	4.5E-08	6.4	7.07E-09	5.30E-09	3.54E-09	1.77E-09	No
Tranquilizer	Meprobamate	Mid Upper Cook Inlet	3.83E-01	2.19E+03	1.75E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.21E-06	1.77E-07	0	1.8E-07	3	5.90E-08	4.43E-08	2.95E-08	1.48E-08	No
Urinary steroid	Androsterone	Mid Upper Cook Inlet	5.71E-02	2.19E+03	2.61E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	505.6	1.128	1.033	1.49E-05	1.19E-06	0	1.2E-06	200	5.95E-09	4.46E-09	2.98E-09	1.49E-09	No
VOCs	1,1,1-Trichloroethane (TCA)	Mid Upper Cook Inlet	7.90E-01	2.19E+03	3.61E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	81.64	1.01	1.002	2.98E-05	2.38E-06	0	2.4E-06	999	2.38E-09	1.79E-09	1.19E-09	5.96E-10	No
VOCs	1,2-Dichloroethane (EDC)	Mid Upper Cook Inlet	8.00E-02	2.19E+03	3.65E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	17.604	1	1	6.43E-07	5.15E-08	0	5.1E-08	382	1.35E-10	1.01E-10	6.74E-11	3.37E-11	No
VOCs	1,4-Dichlorobenzene	Mid Upper Cook Inlet	8.40E-01	2.19E+03	3.84E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	345.76	1.067	1.014	1.42E-04	1.13E-05	0	1.1E-05	2.5	4.53E-06	3.40E-06	2.27E-06	1.13E-06	No
VOCs	2-Butanone (MEK)	Mid Upper Cook Inlet	6.80E+01	2.19E+03	3.11E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	3.93E-04	3.14E-05	0	3.1E-05	1771	1.77E-08	1.33E-08	8.87E-09	4.44E-09	No
VOCs	2-Hexanone	Mid Upper Cook Inlet	5.70E+00	2.19E+03	2.60E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	15.12	1	1	3.94E-05	3.15E-06	0	3.1E-06	8.27	3.81E-07	2.86E-07	1.90E-07	9.52E-08	No
VOCs	Acetone	Mid Upper Cook Inlet	3.00E+02	2.19E+03	1.37E-01	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.73E-03	1.39E-04	0	1.4E-04	20	6.93E-06	5.20E-06	3.47E-06	1.73E-06	No
VOCs	Acrolein	Mid Upper Cook Inlet	1.30E+00	2.19E+03	5.94E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	7.51E-06	6.01E-07	0	6.0E-07	0.05	1.20E-05	9.01E-06	6.01E-06	3.00E-06	No
VOCs	Benzene	Mid Upper Cook Inlet	7.80E-01	2.19E+03	3.56E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	47.24	1.005	1	1.69E-05	1.35E-06	0	1.4E-06	26.36	5.13E-08	3.85E-08	2.57E-08	1.28E-08	No
VOCs	Bromodichloromethane	Mid Upper Cook Inlet	8.00E-02	2.19E+03	3.65E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	38.784	1.005	1	1.42E-06	1.14E-07	0	1.1E-07	3.58	3.18E-08	2.39E-08	1.59E-08	7.96E-09	No
VOCs	Bromomethane	Mid Upper Cook Inlet	9.00E-02	2.19E+03	4.11E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	11.328	1	1	4.66E-07	3.73E-08	0	3.7E-08	0.284	1.31E-07	9.84E-08	6.56E-08	3.28E-08	No
VOCs	Carbon Disulfide	Mid Upper Cook Inlet	7.00E-01	2.19E+03	3.20E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	35.404	1	1	1.13E-05	9.06E-07	0	9.1E-07	11	8.23E-08	6.18E-08	4.12E-08	2.06E-08	No
VOCs	Chlorobenzene	Mid Upper Cook Inlet	8.00E-02	2.19E+03	3.65E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	138.96	1.028	1.007	5.22E-06	4.18E-07	0	4.2E-07	19	2.20E-08	1.65E-08	1.10E-08	5.50E-09	No
VOCs	Chloroethane	Mid Upper Cook Inlet	6.90E-01	2.19E+03	3.15E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	16.316	1	1	5.14E-06	4.11E-07	0	4.1E-07	--	--	--	--	--	Uncertainty
VOCs	Chloroform	Mid Upper Cook Inlet	3.95E+00	2.19E+03	1.80E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	37.056	1	1	6.69E-05	5.35E-06	0	5.3E-06	2.58	2.07E-06	1.56E-06	1.04E-06	5.18E-07	No
VOCs	Chloromethane	Mid Upper Cook Inlet	1.90E+00	2.19E+03	8.68E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.10E-05	8.78E-07	0	8.8E-07	3.2	2.74E-07	2.06E-07	1.37E-07	6.86E-08	No
VOCs	cis-1,2-Dichloroethene	Mid Upper Cook Inlet	7.00E-02	2.19E+03	3.20E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	38.784	1.005	1	1.25E-06	9.97E-08	0	1.0E-07	90.4	1.10E-09	8.27E-10	5.52E-10	2.76E-10	No
VOCs	Dichloromethane (Methylene Chlori	Mid Upper Cook Inlet	6.85E+00	2.19E+03	3.13E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.412	1	1	3.88E-05	3.11E-06	0	3.1E-06	5.85	5.31E-07	3.98E-07	2.66E-07	1.33E-07	No
VOCs	Ethylbenzene	Mid Upper Cook Inlet	1.50E+00	2.19E+03	6.85E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	222.56	1.042	1.009	1.59E-04	1.27E-05	0	1.3E-05	97.1	1.31E-07	9.82E-08	6.55E-08	3.27E-08	No
VOCs	m,p-Xylenes	Mid Upper Cook Inlet	6.20E+00	2.19E+03	2.83E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	226	1.042	1.009	6.67E-04	5.34E-05	0	5.3E-05	2.1	2.54E-05	1.91E-05	1.27E-05	6.35E-06	No
VOCs	o-Xylene	Mid Upper Cook Inlet	2.60E+00	2.19E+03	1.19E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	225.96	1.042	1.009	2.80E-04	2.24E-05	0	2.2E-05	2.1	1.07E-05	7.99E-06	5.33E-06	2.66E-06	No
VOCs	Styrene	Mid Upper Cook Inlet	5.50E+00	2.19E+03	2.51E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	164.24	1.028	1.007	4.24E-04	3.39E-05	0	3.4E-05	200	1.70E-07	1.27E-07	8.48E-08	4.24E-08	No
VOCs	Tetrachloroethene (PCE)	Mid Upper Cook Inlet	6.00E-01	2.19E+03	2.74E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	325.36	1.067	1.014	9.52E-05	7.61E-06	0	7.6E-06	63	1.21E-07	9.06E-08	6.04E-08	3.02E-08	No
VOCs	Toluene	Mid Upper Cook Inlet	1.60E+01	2.19E+03	7.31E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	117.56	1.01	1.002	8.68E-04	6.94E-05	0	6.9E-05	26	2.67E-06	2.00E-06	1.34E-06	6.68E-07	No
VOCs	Trichloroethene (TCE)	Mid Upper Cook Inlet	7.00E-02	2.19E+03	3.20E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	73.4	1.01	1.002	2.37E-06	1.90E-07	0	1.9E-07	2.8	6.77E-08	5.08E-08	3.39E-08	1.69E-08	No
VOCs	Vinyl Chloride	Mid Upper Cook Inlet	2.00E-02	2.19E+03	9.14E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	21.884	1	1	2.00E-07	1.60E-08	0	1.6E-08	0.17	9.41E-08	7.06E-08	4.70E-08	2.35E-08	No
Metals	Antimony	Turnagain Arm	9.04E-01	9.39E+03	9.63E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	4	1	1	3.85E-07	1.16E-08	0	1.2E-08	0.059	6.86E-09	5.14E-09	3.43E-09	1.71E-09	No
Metals	Arsenic	Turnagain Arm	3.42E+00	9.39E+03	3.64E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	176	1	1	6.41E-05	1.92E-06	0	1.9E-06	1.04	6.48E-08	4.86E-08	3.24E-08	1.62E-08	No
Metals	Beryllium	Turnagain Arm	1.80E-02	9.39E+03	1.92E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	76	1	1	1.46E-07	4.37E-09	0	4.4E-09	0.532	2.88E-10	2.16E-10	1.44E-10	7.19E-11	No
Metals	Cadmium	Turnagain Arm	3.09E-01	9.39E+03	3.29E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	152	1	1	5.00E-06	1.50E-07	0	1.5E-07	0.77	6.82E-09	5.12E-09	3.41E-09	1.71E-09	No
Metals	Chromium	Turnagain Arm	3.46E+00	9.39E+03	3.69E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	64	1	1	2.36E-05	7.08E-07	0	7.1E-07	2.4	1.03E-08	7.74E-09	5.16E-09	2.58E-09	No
Metals	Copper	Turnagain Arm	1.15E+02	9.39E+03	1.23E-02	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	144	1	1	1.76E-03	5.29E-05	0	5.3E-05	5.6	3.31E-07	2.48E-07	1.65E-07	8.27E-08	No
Metals	Dissolved Antimony	Turnagain Arm	8.06E-01	9.39E+03	8.59E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	4	1	1	3.44E-07	1.03E-08	0	1.0E-08	0.059	6.11E-09	4.59E-09	3.06E-09	1.53E-09	No
Metals	Dissolved Arsenic	Turnagain Arm	2.78E+00	9.39E+03	2.96E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	176	1	1	5.21E-05	1.56E-06	0	1.6E-06	1.04	5.26E-08	3.95E-08	2.63E-08	1.32E-08	No
Metals	Dissolved Beryllium	Turnagain Arm	4.00E-03	9.39E+03	4.26E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	76	1	1	3.24E-08	9.72E-10	0	9.7E-10	0.532	6.39E-11	4.79E-11	3.20E-11	1.60E-11	No
Metals	Dissolved Cadmium	Turnagain Arm	2.10E-01	9.39E+03	2.24E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	152	1	1	3.40E-06	1.02E-07	0	1.0E-07	0.77	4.64E-09	3.48E-09	2.32E-09	1.16E-09	No
Metals	Dissolved Chromium	Turnagain Arm	3.63E+00	9.39E+03	3.87E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	64	1	1	2.48E-05	7.43E-07	0	7.4E-07	2.4	1.08E-08	8.12E-09	5.42E-09	2.71E-09	No
Metals	Dissolved Copper	Turnagain Arm	4.18E+01	9.39E+03	4.45E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	144	1	1	6.41E-04	1.92E-05	0	1.9E-05	5.6	1.20E-07	9.02E-08	6.01E-08	3.01E-08	No
Metals	Dissolved Lead	Turnagain Arm	1.54E+00	9.39E+03	1.64E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	2.08E-06	6.23E-08	0	6.2E-08	4.7	4.64E-10	3.48E-10	2.32E-10	1.16E-10	No
Metals	Dissolved Mercury	Turnagain Arm	8.94E-02	9.39E+03	9.53E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	25036	2.52	12.6	6.01E-04	1.80E-05	0	1.8E-05	1.41	4.48E-07	3.36E-07	2.24E-07	1.12E-07	No
Metals	Dissolved Molybdenum	Turnagain Arm	4.76E+01	9.39E+03	5.07E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	6.41E-05	1.92E-06	0	1.9E-06	0.52	1.30E-07	9.71E-08	6.48E-08	3.24E-08	No
Metals	Dissolved Nickel	Turnagain Arm	9.49E+00	9.39E+03	1.01E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	188	1	1	1.90E-04	5.70E-06	0	5.7E-06	1.7	1.17E-07	8.81E-08	5.87E-08	2.94E-08	No
Metals	Dissolved Selenium	Turnagain Arm	1.00E+00	9.39E+03	1.07E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.35E-06	4.04E-08	0	4.0E-08	0.143	9.90E-09	7.42E-09	4.95E-09	2.47E-09	No
Metals	Dissolved Silver	Turnagain Arm	4.22E-01	9.39E+03	4.50E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	5.69E-07	1.71E-08	0	1.7E-08	6.02	9.92E-11	7.44E-11	4.96E-11	2.48E-11	No
Metals	Dissolved Thallium	Turnagain Arm	3.20E-02	9.39E+03	3.41E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	4.31E-08	1.29E-09	0	1.3

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4										
Metals	Dissolved Zinc	Turnagain Arm	1.24E+02	9.39E+03	1.32E-02	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	188	1	1	2.48E-03	7.45E-05	0	7.5E-05	75.4	3.46E-08	2.59E-08	1.73E-08	8.65E-09	No
Metals	Lead	Turnagain Arm	4.80E+00	9.39E+03	5.11E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	6.47E-06	1.94E-07	0	1.9E-07	4.7	1.45E-09	1.08E-09	7.23E-10	3.61E-10	No
Metals	Mercury	Turnagain Arm	1.14E-01	9.39E+03	1.21E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	25036	2.52	12.6	7.66E-04	2.30E-05	0	2.3E-05	1.41	5.71E-07	4.28E-07	2.85E-07	1.43E-07	No
Metals	Molybdenum	Turnagain Arm	4.87E+01	9.39E+03	5.19E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	6.56E-05	1.97E-06	0	2.0E-06	0.52	1.33E-07	9.94E-08	6.63E-08	3.31E-08	No
Metals	Nickel	Turnagain Arm	6.70E+00	9.39E+03	7.14E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	188	1	1	1.34E-04	4.03E-06	0	4.0E-06	1.7	8.29E-08	6.22E-08	4.14E-08	2.07E-08	No
Metals	Selenium	Turnagain Arm	1.20E+00	9.39E+03	1.28E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	19.52	1	1	2.50E-06	7.49E-08	0	7.5E-08	0.143	1.83E-08	1.37E-08	9.16E-09	4.58E-09	No
Metals	Silver	Turnagain Arm	4.90E-01	9.39E+03	5.22E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	2	1	1	1.04E-07	3.13E-09	0	3.1E-09	6.02	1.82E-11	1.37E-11	9.11E-12	4.55E-12	No
Metals	Thallium	Turnagain Arm	5.20E-02	9.39E+03	5.54E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	464	1	1	2.57E-06	7.71E-08	0	7.7E-08	0.096	2.81E-08	2.11E-08	1.41E-08	7.03E-09	No
Metals	Zinc	Turnagain Arm	1.65E+02	9.39E+03	1.76E-02	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	188	1	1	3.31E-03	9.92E-05	0	9.9E-05	75.4	4.60E-08	3.45E-08	2.30E-08	1.15E-08	No
Cyanide	Cyanide, Total	Turnagain Arm	9.00E+00	9.39E+03	9.59E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.21E-05	3.64E-07	0	3.6E-07	0.38	3.35E-08	2.51E-08	1.68E-08	8.38E-09	No
ACE inhibitor	Enalapril	Turnagain Arm	1.21E-02	9.39E+03	1.29E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.63E-08	4.89E-10	0	4.9E-10	8	2.14E-12	1.61E-12	1.07E-12	5.35E-13	No
Ammonia	Total Ammonia	Turnagain Arm	3.30E+04	9.39E+03	3.52E+00	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	4.45E-02	1.33E-03	0	1.3E-03	--	--	--	--	--	Uncertainty
Anabolic agent	Androstenedione	Turnagain Arm	1.62E-01	9.39E+03	1.73E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	121.2	1.028	1.007	2.15E-06	6.45E-08	0	6.5E-08	12	1.88E-10	1.41E-10	9.41E-11	4.70E-11	No
Analgesic	Ibuprofen	Turnagain Arm	2.09E+01	9.39E+03	2.23E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1.253	1.072	3.53E-05	1.06E-06	0	1.1E-06	1.98	1.87E-08	1.40E-08	9.36E-09	4.68E-09	No
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	Turnagain Arm	3.87E+01	9.39E+03	4.12E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1.01	1.002	5.27E-05	1.58E-06	0	1.6E-06	5.02	1.10E-08	8.26E-09	5.51E-09	2.75E-09	No
Anti-acid reflux	Ranitidine	Turnagain Arm	8.44E-02	9.39E+03	8.99E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.14E-07	3.41E-09	0	3.4E-09	--	--	--	--	--	Uncertainty
Antiasthmatic	Albuterol	Turnagain Arm	2.01E-02	9.39E+03	2.14E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	2.71E-08	8.13E-10	0	8.1E-10	8	3.56E-12	2.67E-12	1.78E-12	8.89E-13	No
Antiasthmatic	Theophylline	Turnagain Arm	5.11E+01	9.39E+03	5.44E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	6.89E-05	2.07E-06	0	2.1E-06	0.9	8.03E-08	6.03E-08	4.02E-08	2.01E-08	No
Antibacterial	Penicillin V	Turnagain Arm	1.34E-02	9.39E+03	1.43E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1.005	1	1.81E-08	5.44E-10	0	5.4E-10	14	1.36E-12	1.02E-12	6.81E-13	3.40E-13	No
Antibiotic	4-Epitetracycline [ETC]	Turnagain Arm	6.62E-02	9.39E+03	7.05E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	8.92E-08	2.68E-09	0	2.7E-09	6.4	1.46E-11	1.10E-11	7.32E-12	3.66E-12	No
Antibiotic	Enrofloxacin	Turnagain Arm	7.08E-04	9.39E+03	7.54E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	9.54E-10	2.86E-11	0	2.9E-11	2	5.01E-13	3.76E-13	2.50E-13	1.25E-13	No
Anticonvulsant	Benztropine	Turnagain Arm	1.05E-03	9.39E+03	1.12E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1245.2	1.491	1.178	2.08E-07	6.23E-09	0	6.2E-09	0.1	2.18E-09	1.64E-09	1.09E-09	5.45E-10	No
Anticonvulsant	Carbamazepine	Turnagain Arm	5.06E-01	9.39E+03	5.39E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	76.84	1.01	1.002	4.18E-06	1.26E-07	0	1.3E-07	2.116	2.08E-09	1.56E-09	1.04E-09	5.19E-10	No
Antidepressant	10-hydroxy-amitriptyline	Turnagain Arm	1.92E-02	9.39E+03	2.05E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	330.56	1.067	1.014	7.22E-07	2.16E-08	0	2.2E-08	--	--	--	--	--	Uncertainty
Antidepressant	Amitriptyline	Turnagain Arm	7.46E-02	9.39E+03	7.95E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	3275.6	2.78	2.193	7.24E-05	2.17E-06	0	2.2E-06	0.28	2.71E-07	2.04E-07	1.36E-07	6.79E-08	No
Antidiabetic drug	Glipizide	Turnagain Arm	1.07E-02	9.39E+03	1.14E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	33.828	1	1	3.86E-08	1.16E-09	0	1.2E-09	--	--	--	--	--	Uncertainty
Antidiabetic drug	Glyburide	Turnagain Arm	1.85E-02	9.39E+03	1.97E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	2689.2	2.452	1.871	1.30E-05	3.90E-07	0	3.9E-07	13	1.05E-09	7.87E-10	5.25E-10	2.62E-10	No
Antidiabetic drug	Metformin	Turnagain Arm	8.93E+01	9.39E+03	9.52E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.20E-04	3.61E-06	0	3.6E-06	0.92	1.37E-07	1.03E-07	6.87E-08	3.43E-08	No
Antifungal agent	Miconazole	Turnagain Arm	5.62E-02	9.39E+03	5.99E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	24768	12.691	21.677	1.88E-03	5.65E-05	0	5.6E-05	2.076	9.52E-07	7.14E-07	4.76E-07	2.38E-07	No
Antihistamine	Diphenhydramine	Turnagain Arm	1.68E+00	9.39E+03	1.79E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	267.04	1.053	1.012	5.03E-05	1.51E-06	0	1.5E-06	2	2.64E-08	1.98E-08	1.32E-08	6.61E-09	No
Antihistamine	Promethazine	Turnagain Arm	3.35E-02	9.39E+03	3.57E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	2771.2	2.452	1.871	2.43E-05	7.28E-07	0	7.3E-07	0.22	1.16E-07	8.68E-08	5.79E-08	2.89E-08	No
Antihypertensive	Diltiazem	Turnagain Arm	4.06E-01	9.39E+03	4.33E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	112.32	1.01	1.002	4.91E-06	1.47E-07	0	1.5E-07	2.96	1.74E-09	1.31E-09	8.70E-10	4.35E-10	No
Antihypertensive	Valsartan	Turnagain Arm	1.58E+01	9.39E+03	1.68E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	400	1.128	1.033	7.60E-04	2.28E-05	0	2.3E-05	--	--	--	--	--	Uncertainty
Antihypertensive	Verapamil	Turnagain Arm	5.12E-02	9.39E+03	5.46E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	588.4	1.161	1.042	3.73E-06	1.12E-07	0	1.1E-07	0.456	8.58E-09	6.44E-09	4.29E-09	2.15E-09	No
Antilipemic	Gemfibrozil	Turnagain Arm	1.33E+00	9.39E+03	1.42E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	2.452	1.871	4.40E-06	1.32E-07	0	1.3E-07	12.648	3.65E-10	2.74E-10	1.82E-10	9.12E-11	No
Antimicrobial, disinfectant	Triclocarban	Turnagain Arm	4.89E-03	9.39E+03	5.21E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	3186	2.78	2.193	4.61E-06	1.38E-07	0	1.4E-07	138.4	3.50E-11	2.63E-11	1.75E-11	8.75E-12	No
Antimicrobial, disinfectant	Triclosan	Turnagain Arm	4.31E+00	9.39E+03	4.59E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	2568.8	2.452	1.871	2.89E-03	8.68E-05	0	8.7E-05	6	5.06E-07	3.80E-07	2.53E-07	1.27E-07	No
Antipyretic, analgesic	Acetaminophen	Turnagain Arm	1.22E+02	9.39E+03	1.30E-02	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.64E-04	4.93E-06	0	4.9E-06	66.66	2.59E-09	1.94E-09	1.29E-09	6.47E-10	No
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	Turnagain Arm	5.78E+01	9.39E+03	6.16E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	7.79E-05	2.34E-06	0	2.3E-06	--	--	--	--	--	Uncertainty
Betablocker	Atenolol	Turnagain Arm	1.88E+00	9.39E+03	2.00E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	2.53E-06	7.60E-08	0	7.6E-08	8	3.33E-10	2.49E-10	1.66E-10	8.31E-11	No
Betablocker	Metoprolol	Turnagain Arm	4.89E-01	9.39E+03	5.21E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	17.944	1	1	9.35E-07	2.80E-08	0	2.8E-08	4.632	2.12E-10	1.59E-10	1.06E-10	5.30E-11	No
Betablocker	Propranolol	Turnagain Arm	7.48E-02	9.39E+03	7.97E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	203.96	1.083	1.019	1.76E-06	5.28E-08	0	5.3E-08	1.28	1.44E-09	1.08E-09	7.22E-10	3.61E-10	No
BloodThinner	Warfarin	Turnagain Arm	4.03E-03	9.39E+03	4.29E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	112.32	1.01	1.002	4.87E-08	1.46E-09	0	1.5E-09	0.0064	7.99E-09	5.99E-09	4.00E-09	2.00E-09	No
ChannelBlocker	Amlodipine	Turnagain Arm	2.48E-02	9.39E+03	2.64E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	177.2	1.028	1.007	4.81E-07	1.44E-08	0	1.4E-08	2	2.53E-10	1.90E-10	1.26E-10	6.32E-11	No
ChannelBlocker	Dehydronifedipine	Turnagain Arm	1.40E-03	9.39E+03	1.49E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	222.96	1.042	1.009	3.47E-08	1.04E-09	0	1.0E-09	--	--	--	--	--	Uncertainty
ChannelBlocker	Desmethyldiltiazem	Turnagain Arm	8.36E-02	9.39E+03	8.91E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	112.32	1.01	1.002	1.01E-06	3.03E-08	0	3.0E-08	--	--	--	--	--	Uncertainty
ChannelBlocker	Norverapamil	Turnagain Arm	1.89E-02	9.39E+03	2.01E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1970.4	1.95	1.459	7.74E-06	2.32E-07	0	2.3E-07	0.032	2.54E-07	1.90E-07	1.27E-07	6.35E-08	No
Cocaine metabolite	Benzoylecgonine	Turnagain Arm	1.96E+00	9.39E+03	2.09E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	2.64E-06	7.92E-08	0	7.9E-08	0.3804	7.29E-09	5.47E-09	3.65E-09	1.82E-09	No
Contraceptive	Norgestrel	Turnagain Arm	8.18E-02	9.39E+03	8.72E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	367.32	1.083	1.019	3.47E-06	1.04E-07	0	1.0E-07	20.04	1.82E-10	1.36E-10	9.08E-11	4.54E-11	No
Corticosteroid	Hydrocortisone	Turnagain Arm	7.82E-01	9.39E+03	8.33E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	21.444	1	1	1.79E-06	5.36E-08	0	5.4E-08	0.6	3.13E-09	2.35E-09	1.56E-09	7.82E-10	No
Depressant	Alprazolam	Turnagain Arm	3.23E-03	9.39E+03	3.44E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	46.56	1.005	1	1.61E-08	4.83E-10	0	4.8E-10	2.16	7.83E-12	5.87E-12	3.91E-12	1.96E-12	No
Depressant	Diazepam	Turnagain Arm	8.27E-04	9.39E+03	8.81E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	134.8	1.028	1.007	1.22E-08	3.66E-10	0	3.7E-10	1.112	1.15E-11	8.65E-12	5.77E-12	2.88E-12	No
Diuretic	Furosemide	Turnagain Arm	2.08E-01	9.39E+03	2.22E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1.005	1	2.82E-07	8.45E-09	0	8.5E-09	10.4	2.84E-11	2.13E-11	1.42E-11	7.11E-12	No
Diuretic	Hydrochlorothiazide	Turnagain Arm	1.07E+00	9.39E+03	1.14E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.44E-06	4.33E-08	0	4.3E-08	12.32	1.23E-10	9.22E-11	6.14E-11	3.07E-11	No
Diuretic	Triamterene	Turnagain Arm	9.41E-02	9.39E+03	1.00E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.27E-07	3.80E-09	0	3.8E-09	1.6	8.32E-11	6.24E-11	4.16E-11	2.08E-11	No
Fungicide and parasiticide	Thiabendazole	Turnagain Arm	3.06E-02	9.39E+03	3.26E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	79.2	1.01	1.002	2.61E-07	7.82E-09	0	7.8E-09	5.2	5.27E-11	3.95E-11	2.63E-11	1.32E-11	No
Glycoside	Digoxin	Turnagain Arm	7.01E-02	9.39E+03	7.47E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.6	1	1	9.41E-08	2.82E-09	0	2.8E-09	0.07112	1.39E-09	1.04E-09	6.95E-10	3.47E-10	No
Lincosamide antibiotic	Lincomycin	Turnagain Arm	4.35E-02	9.39E+03	4.64E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	5.86E-08	1.76E-09	0	1.8E-09	3.132	1.97E-11	1.47E-11	9.83E-12	4.91E-12	No
Macrolide antibiotic	Azithromycin	Turnagain Arm	3.41E-01	9.39E+03	3.63E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	834.4	1.253	1.072	3.80E-05	1.14E-06	0	1.1E-06	12	3.32E-09	2.49E-09	1.66E-09	8.31E-10	No
Macrolide antibiotic	Clarithromycin	Turnagain Arm	1.65E-01	9.39E+03	1.76E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	225.96	1.042	1.009	4.14E-06	1.24E-07	0	1.2E-07	5.08	8.56E-10	6.42E-10	4.28E-10	2.14E-10	No
Macrolide antibiotic	Erythromycin-H2O	Turnagain Arm	1.68E-01	9.39E+03	1.79E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	194.12	1.034	1.007	3.59E-06	1.08E-07	0	1.1E-07	10.32	3.66E-10	2.74E-10	1.83E-10	9.14E-11	No
Macrolide antibiotic	Roxithromycin	Turnagain Arm	9.41E-04	9.39E+03	1.00E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	121.36	1.028	1.007	1.25E-08	3.75E-10	0	3.8E-10	0.8	1.64E-11	1.23E-11	8.21E-12	4.10E-12	No
Macrolide antibiotic	Tylosin	Turnagain Arm	1.43E-03	9.39E+03	1.52E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	22.108	1	1	3.37E-09	1.01E-10	0	1.0E-10	3.2	1.11E-12	8.29E-13	5.53E-13	2.76E-13	No
Nicotinemetabolite	Cotinine	Turnagain Arm	2.80E+00	9.39E+03	2.98E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	3.77E-06	1.13E-07	0	1.1E-07	6.416	6.18E-10	4.63E-10	3.09E-10	1.54E-10	No
Non-steroidalanti-inflammatory dr	Naproxen	Turnagain Arm	1.24E+01	9.39E+03	1.32E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1.042	1.009	1.74E-05	5.22E-07	0	5.2E-07	4.936	3.70E-09	2.78E-09	1.85E-09	9.26E-10	No
Oil & Grease	Oil and Grease, Total (HEM)	Turnagain Arm	4.27E+04	9.39E+03	4.55E+00	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	0	0	0	0.00E+00	0.00E+00	0	0.0E+00	--	--	--	--	--	Uncertainty
Opiate	Codeine	Turnagain Arm	1.52E-01	9.39E+03	1.62E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	11.328	1	1	1.83E-07	5.50E-09	0	5.5E-09	1.708	1.13E-10	8.46E-11	5.64E-11	2.82E-11	No
Opiate	Hydrocodone	Turnagain Arm	6.87E-02	9.39E+03	7.32E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	49.8	1.005	1	3.66E-07	1.10E-08	0	1.1E-08	1.5	2.56E-10	1.92E-10	1.28E-10	6.41E-11	No
Opiate	Oxycodone	Turnagain Arm	1.60E-01	9.39E+03	1.70E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	2.16E-07	6.47E-09	0	6.5E-09	1.28	1.77E-10	1.33E-10	8.84E-11	4.42E-11	No
Opiod	Propoxyphene	Turnagain Arm	1.02E-02	9.39E+03	1.09E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1064.4	1.38	1.13	1.60E-06	4.79E-08	0	4.8E-08	0.54	3.10E-09	2.33E-09	1.55E-09	7.76E-10	No
PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-2	Turnagain Arm	2.58E-02	9.39E+03	2.75E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	166.84	1.493	0.226	6.85E-07	2.05E-08	0	2.1E-08	2.22	3.24E-10	2.43E-10	1.62E-10	8.10E-11	No
PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	Turnagain Arm	5.24E-03	9.39E+03	5.58E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	60560	14.355	26.669	4.85E-04	1.46E-05	0	1.5E-05	0.5	1.02E-06	7.64E-07	5.10E-07	2.55E-07	No
PBDEs	2,2',3,4,4',5,5',6-OcBDE	Turnagain Arm	1.41E-03	9.39E+03	1.50E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	7728	2.732	0.778	3.17E-06	9.52E-08	0	9.5E-08	0.07	4.76E-08	3.57E-08	2.38E-08	1.19E-08	No
PBDEs	2,2',3,4,4',5',6-HpBDE	Turnagain Arm	6.87E-04	9.39E+03	7.32E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	3393.2	1.493	0.226	3.71E-07	1.11E-08	0	1.1E-08	0.07	5.56E-09	4.17E-09	2.78E-09	1.39E-09	No
PBDEs	2,2',3,4,4',5'-HxBDE	Turnagain Arm	4.94E-04	9.39E+03	5.26E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	9264	3.296	1.146	1.61E-06	4.82E-08	0	4.8E-08	0.07	2.41E-08	1.81E-08	1.21E-08	6.03E-09	No
PBDEs	2,2',3,4,4',6'-HxBDE	Turnagain Arm	1.54E-04	9.39E+03	1.64E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	9264	3.296	1.146	5.01E-07	1.50E-08	0	1.5E-08	0.07	7.52E-09	5.64E-09	3.76E-09	1.88E-09	No
PBDEs	2,2',3,4,4'-PeBDE	Turnagain Arm	1.82E-03	9.39E+03	1.94E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	25280	10.914	14.388	5.35E-05	1.61E-06	0	1.6E-06	0.07	8.03E-07	6.02E-07	4.01E-07	2.01E-07	No
PBDEs	2,2',4,4',5,5'-HxBDE	Turnagain Arm	3.60E-03	9.39E+03	3.84E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	9264	3.296	1.146	1.17E-05	3.51E-07	0	3.5E-07	0.07	1.76E-07	1.32E-07	8.78E-08	4.39E-08	No
PBDEs	2,2',4,4',5,6'-HxBDE	Turnagain Arm	3.05E-03	9.39E+03	3.25E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	9264	3.296	1.146	9.92E-06	2.98E-07	0	3.0E-07	0.07	1.49E-07	1.12E-07	7.44E-08	3.72E-08	No
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	Turnagain Arm	4.06E-02	9.39E+03	4.33E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	60560	14.355	26.669	3.76E-03	1.13E-04	0	1.1E-04	0.058	6.81E-05	5.11E-05	3.40E-05	1.70E-05	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
PBDEs	2,2',4,4',6,6'-HxBDE	Turnagain Arm	2.13E-04	9.39E+03	2.27E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	9264	3.296	1.146	6.93E-07	2.08E-08	0	2.1E-08	0.07	1.04E-08	7.80E-09	5.20E-09	2.60E-09	No
PBDEs	2,2',4,4',6-PeBDE	Turnagain Arm	8.11E-03	9.39E+03	8.64E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	25280	10.914	14.388	2.38E-04	7.15E-06	0	7.2E-06	0.07	3.58E-06	2.68E-06	1.79E-06	8.94E-07	No
PBDEs	2,2',4,4'-TeBDE (BDE-47)	Turnagain Arm	4.32E-02	9.39E+03	4.60E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	54400	14.355	26.669	3.59E-03	1.08E-04	0	1.1E-04	0.07	5.39E-05	4.04E-05	2.70E-05	1.35E-05	No
PBDEs	2,2',4,5'-TeBDE	Turnagain Arm	1.56E-03	9.39E+03	1.66E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	54400	14.355	26.669	1.30E-04	3.89E-06	0	3.9E-06	0.07	1.95E-06	1.46E-06	9.74E-07	4.87E-07	No
PBDEs	2,2',4,6'-TeBDE	Turnagain Arm	2.40E-04	9.39E+03	2.56E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	54400	14.355	26.669	2.00E-05	5.99E-07	0	6.0E-07	0.07	3.00E-07	2.25E-07	1.50E-07	7.49E-08	No
PBDEs	2,2',4-TriBDE	Turnagain Arm	1.11E-03	9.39E+03	1.18E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	14076	9.716	13.964	1.62E-05	4.85E-07	0	4.9E-07	0.07	2.43E-07	1.82E-07	1.21E-07	6.07E-08	No
PBDEs	2,3',4,4',6-PeBDE	Turnagain Arm	2.02E-04	9.39E+03	2.15E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	25280	10.914	14.388	5.94E-06	1.78E-07	0	1.8E-07	0.07	8.91E-08	6.68E-08	4.45E-08	2.23E-08	No
PBDEs	2,3',4,4'-TeBDE	Turnagain Arm	1.50E-03	9.39E+03	1.60E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	54400	14.355	26.669	1.25E-04	3.74E-06	0	3.7E-06	0.07	1.87E-06	1.40E-06	9.36E-07	4.68E-07	No
PBDEs	2,3',4',6-TeBDE	Turnagain Arm	5.58E-04	9.39E+03	5.95E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	54400	14.355	26.669	4.64E-05	1.39E-06	0	1.4E-06	0.07	6.96E-07	5.22E-07	3.48E-07	1.74E-07	No
PBDEs	2,4,4'-TriBDE	Turnagain Arm	1.35E-03	9.39E+03	1.44E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	14076	9.716	13.964	1.97E-05	5.90E-07	0	5.9E-07	0.07	2.95E-07	2.21E-07	1.48E-07	7.38E-08	No
Pesticides	2,4'-DDD	Turnagain Arm	1.07E-03	9.39E+03	1.14E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	13944	9.716	13.964	1.54E-05	4.63E-07	0	4.6E-07	0.147	1.10E-07	8.27E-08	5.52E-08	2.76E-08	No
Pesticides	4,4'-DDD	Turnagain Arm	2.10E-02	9.39E+03	2.24E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	17420	10.556	15.996	4.11E-04	1.23E-05	0	1.2E-05	0.147	2.94E-06	2.20E-06	1.47E-06	7.35E-07	No
Pesticides	4,4'-DDE	Turnagain Arm	4.70E-03	9.39E+03	5.01E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	36672	13.662	24.604	2.51E-04	7.53E-06	0	7.5E-06	0.147	1.79E-06	1.34E-06	8.96E-07	4.48E-07	No
Pesticides	4,4'-DDT	Turnagain Arm	1.86E-04	9.39E+03	1.98E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	67360	14.388	26.669	1.92E-05	5.76E-07	0	5.8E-07	0.147	1.37E-07	1.03E-07	6.86E-08	3.43E-08	No
Pesticides	Aldrin	Turnagain Arm	9.70E-03	9.39E+03	1.03E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	36120	13.662	24.604	5.10E-04	1.53E-05	0	1.5E-05	0.2	2.68E-06	2.01E-06	1.34E-06	6.69E-07	No
Pesticides	Chlordane, alpha (cis)	Turnagain Arm	1.42E-04	9.39E+03	1.51E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	23604	12.064	19.907	4.31E-06	1.29E-07	0	1.3E-07	0.15	3.02E-08	2.26E-08	1.51E-08	7.54E-09	No
Pesticides	Chlorpyriphos	Turnagain Arm	9.72E-04	9.39E+03	1.04E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	3480.8	3.181	2.612	1.15E-06	3.44E-08	0	3.4E-08	0.1	1.20E-08	9.03E-09	6.02E-09	3.01E-09	No
Pesticides	Chlorpyriphos-Methyl	Turnagain Arm	2.11E-04	9.39E+03	2.25E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1296.4	1.491	1.178	4.35E-08	1.30E-09	0	1.3E-09	0.1	4.56E-10	3.42E-10	2.28E-10	1.14E-10	No
Pesticides	Cypermethrin	Turnagain Arm	4.05E-03	9.39E+03	4.32E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	3881.2	14.388	26.669	2.41E-05	7.23E-07	0	7.2E-07	0.2	1.27E-07	9.49E-08	6.33E-08	3.16E-08	No
Pesticides	DEET	Turnagain Arm	6.36E+00	9.39E+03	6.78E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	51	1.005	1	3.47E-05	1.04E-06	0	1.0E-06	1	3.65E-08	2.74E-08	1.82E-08	9.12E-09	No
Pesticides	Demeton-O,S	Turnagain Arm	3.80E-02	9.39E+03	4.05E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	38.352	1	1	1.55E-07	4.66E-09	0	4.7E-09	0.008	2.04E-08	1.53E-08	1.02E-08	5.10E-09	No
Pesticides	Dieldrin	Turnagain Arm	1.40E-02	9.39E+03	1.49E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	5012	4.188	3.873	3.13E-05	9.39E-07	0	9.4E-07	0.015	2.19E-06	1.64E-06	1.10E-06	5.48E-07	No
Pesticides	Endosulfan Sulfate	Turnagain Arm	2.20E-02	9.39E+03	2.34E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	482.8	1.128	1.033	1.28E-06	3.83E-08	0	3.8E-08	0.058	2.31E-08	1.73E-08	1.16E-08	5.78E-09	No
Pesticides	Endrin	Turnagain Arm	6.20E-05	9.39E+03	6.61E-09	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	5012	4.188	3.873	1.39E-07	4.16E-09	0	4.2E-09	0.184	7.91E-10	5.93E-10	3.96E-10	1.98E-10	No
Pesticides	Endrin Ketone	Turnagain Arm	9.60E-03	9.39E+03	1.02E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	3623.2	3.181	2.612	1.18E-05	3.54E-07	0	3.5E-07	0.184	6.73E-08	5.05E-08	3.36E-08	1.68E-08	No
Pesticides	HCH, alpha	Turnagain Arm	6.60E-05	9.39E+03	7.03E-09	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1001.6	1.315	1.096	9.26E-09	2.78E-10	0	2.8E-10	87	1.12E-13	8.38E-14	5.59E-14	2.79E-14	No
Pesticides	HCH, beta	Turnagain Arm	1.09E-04	9.39E+03	1.16E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1001.6	1.315	1.096	1.53E-08	4.59E-10	0	4.6E-10	0.4	4.02E-11	3.01E-11	2.01E-11	1.00E-11	No
Pesticides	HCH, gamma	Turnagain Arm	6.96E-04	9.39E+03	7.42E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1001.6	1.315	1.096	9.77E-08	2.93E-09	0	2.9E-09	0.014	7.33E-09	5.49E-09	3.66E-09	1.83E-09	No
Pesticides	Heptachlor	Turnagain Arm	1.40E-02	9.39E+03	1.49E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	7552	6.266	7.079	7.06E-05	2.12E-06	0	2.1E-06	0.2	3.71E-07	2.78E-07	1.85E-07	9.27E-08	No
Pesticides	Hexachlorobenzene	Turnagain Arm	5.17E-04	9.39E+03	5.51E-08	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	11212	7.962	10.209	4.92E-06	1.48E-07	0	1.5E-07	7.1	7.27E-10	5.45E-10	3.64E-10	1.82E-10	No
Pesticides	Malathion	Turnagain Arm	5.20E-01	9.39E+03	5.54E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	67	1.01	1.002	3.75E-06	1.12E-07	0	1.1E-07	0.046	8.56E-08	6.42E-08	4.28E-08	2.14E-08	No
Pesticides	Methoxychlor	Turnagain Arm	2.90E-03	9.39E+03	3.09E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	4176	3.643	3.162	4.70E-06	1.41E-07	0	1.4E-07	1.002	4.93E-09	3.69E-09	2.46E-09	1.23E-09	No
Pesticides	Permethrin	Turnagain Arm	4.23E-02	9.39E+03	4.51E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1989.2	13.662	24.604	1.22E-04	3.67E-06	0	3.7E-06	5	2.57E-08	1.93E-08	1.29E-08	6.43E-09	No
PFAS	5:3 FTCA	Turnagain Arm	5.92E-02	9.39E+03	6.31E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1.766	1.334	1.41E-07	4.23E-09	0	4.2E-09	5	2.96E-11	2.22E-11	1.48E-11	7.40E-12	No
PFAS	PFBA	Turnagain Arm	1.49E-02	9.39E+03	1.59E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1.005	1	2.02E-08	6.05E-10	0	6.1E-10	35	6.05E-13	4.54E-13	3.03E-13	1.51E-13	No
PFAS	PFHpA	Turnagain Arm	8.47E-03	9.39E+03	9.03E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1.315	1.096	1.50E-08	4.50E-10	0	4.5E-10	--	--	--	--	--	Uncertainty
PFAS	PFHxA	Turnagain Arm	2.55E-02	9.39E+03	2.72E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1.083	1.019	3.72E-08	1.12E-09	0	1.1E-09	20	1.95E-12	1.47E-12	9.77E-13	4.88E-13	No
PFAS	PFHxS	Turnagain Arm	3.96E-02	9.39E+03	4.22E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1.042	1.009	5.56E-08	1.67E-09	0	1.7E-09	5.72	1.02E-11	7.66E-12	5.10E-12	2.55E-12	No
PFAS	PFNA	Turnagain Arm	5.14E-03	9.39E+03	5.48E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	40	6.266	7.079	1.37E-07	4.12E-09	0	4.1E-09	0.166	8.68E-10	6.51E-10	4.34E-10	2.17E-10	No
PFAS	PFOA	Turnagain Arm	1.85E-02	9.39E+03	1.97E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	2.452	1.871	6.11E-08	1.83E-09	0	1.8E-09	1.75	3.67E-11	2.75E-11	1.83E-11	9.17E-12	No
PFAS	PFOS	Turnagain Arm	6.53E-02	9.39E+03	6.96E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1.766	1.334	1.55E-07	4.66E-09	0	4.7E-09	0.12	1.36E-09	1.02E-09	6.80E-10	3.40E-10	No
PFAS	PFPeA	Turnagain Arm	2.03E-02	9.39E+03	2.16E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1.028	1.007	2.81E-08	8.44E-10	0	8.4E-10	--	--	--	--	--	Uncertainty
PFAS	PFPeS	Turnagain Arm	3.84E-03	9.39E+03	4.09E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1.01	1.002	5.23E-09	1.57E-10	0	1.6E-10	--	--	--	--	--	Uncertainty
Plasticizer	Bisphenol A	Turnagain Arm	1.59E+00	9.39E+03	1.69E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	288.12	1.053	1.012	5.14E-05	1.54E-06	0	1.5E-06	10	5.40E-09	4.05E-09	2.70E-09	1.35E-09	No
Plasticizer	Bisphenol S	Turnagain Arm	8.88E-01	9.39E+03	9.46E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	22.672	1	1	2.15E-06	6.44E-08	0	6.4E-08	10	2.25E-10	1.69E-10	1.13E-10	5.63E-11	No
Pyrimidine antibiotic	Trimethoprim	Turnagain Arm	7.11E-01	9.39E+03	7.58E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	9.58E-07	2.87E-08	0	2.9E-08	0.8	1.26E-09	9.43E-10	6.29E-10	3.14E-10	No
Quinoline antibiotic	Ciprofloxacin	Turnagain Arm	3.72E-01	9.39E+03	3.96E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	5.01E-07	1.50E-08	0	1.5E-08	4	1.32E-10	9.87E-11	6.58E-11	3.29E-11	No
Quinoline antibiotic	Ofloxacin	Turnagain Arm	4.27E-01	9.39E+03	4.55E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	5.75E-07	1.73E-08	0	1.7E-08	2	3.02E-10	2.27E-10	1.51E-10	7.55E-11	No
Rubber Stabilizing compound	6PPD-Quinone	Turnagain Arm	5.30E-03	9.39E+03	5.65E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	781.6	1.253	1.072	5.53E-07	1.66E-08	0	1.7E-08	2	2.90E-10	2.18E-10	1.45E-10	7.26E-11	No
Sex hormone	17 beta-Estradiol	Turnagain Arm	5.52E-03	9.39E+03	5.88E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	822	1.253	1.072	6.06E-07	1.82E-08	0	1.8E-08	0.01	6.36E-08	4.77E-08	3.18E-08	1.59E-08	No
Sex hormone	Estrone	Turnagain Arm	3.31E-02	9.39E+03	3.53E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	215.88	1.034	1.007	7.87E-07	2.36E-08	0	2.4E-08	--	--	--	--	--	Uncertainty
Sex hormone	Progesterone	Turnagain Arm	5.66E-02	9.39E+03	6.03E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	664.4	1.202	1.054	4.82E-06	1.44E-07	0	1.4E-07	0.66	7.66E-09	5.75E-09	3.83E-09	1.92E-09	No
Sex hormone	Testosterone	Turnagain Arm	7.17E-02	9.39E+03	7.64E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	288.12	1.053	1.012	2.32E-06	6.95E-08	0	7.0E-08	1.72	1.41E-09	1.06E-09	7.07E-10	3.54E-10	No
SSRI Antidepressant	Fluoxetine	Turnagain Arm	5.20E-02	9.39E+03	5.54E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	616	1.161	1.042	3.96E-06	1.19E-07	0	1.2E-07	1.136	3.66E-09	2.75E-09	1.83E-09	9.16E-10	No
SSRI Antidepressant	Norfluoxetine	Turnagain Arm	2.73E-02	9.39E+03	2.91E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1068	1.38	1.13	4.29E-06	1.29E-07	0	1.3E-07	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Paroxetine	Turnagain Arm	1.88E-02	9.39E+03	2.00E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	754.4	1.253	1.072	1.89E-06	5.68E-08	0	5.7E-08	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Sertraline	Turnagain Arm	1.08E-01	9.39E+03	1.15E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	5716	4.803	4.742	3.16E-04	9.48E-06	0	9.5E-06	--	--	--	--	--	Uncertainty
Statin	Atorvastatin	Turnagain Arm	2.20E-01	9.39E+03	2.34E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	224.92	13.228	23.281	6.97E-05	2.09E-06	0	2.1E-06	20	3.66E-09	2.75E-09	1.83E-09	9.15E-10	No
Steroid	Methylprednisolone	Turnagain Arm	1.13E-01	9.39E+03	1.20E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	29.396	1	1	3.54E-07	1.06E-08	0	1.1E-08	8	4.65E-11	3.48E-11	2.32E-11	1.16E-11	No
Steroid	Prednisolone	Turnagain Arm	9.31E-03	9.39E+03	9.92E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	21.772	1	1	2.16E-08	6.48E-10	0	6.5E-10	6.72	3.37E-12	2.53E-12	1.69E-12	8.44E-13	No
Steroidal Estrogen	Equilenin	Turnagain Arm	1.34E-02	9.39E+03	1.43E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	726.4	1.202	1.054	1.25E-06	3.74E-08	0	3.7E-08	--	--	--	--	--	Uncertainty
Stimulant	Amphetamine	Turnagain Arm	5.39E-01	9.39E+03	5.74E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	26.936	1	1	1.55E-06	4.64E-08	0	4.6E-08	0.12	1.35E-08	1.02E-08	6.77E-09	3.38E-09	No
Stimulant	Caffeine	Turnagain Arm	1.05E+02	9.39E+03	1.12E-02	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.42E-04	4.25E-06	0	4.2E-06	0.508	2.92E-07	2.19E-07	1.46E-07	7.31E-08	No
Stimulant	Cocaine	Turnagain Arm	7.68E-01	9.39E+03	8.18E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	61.16	1.01	1.002	5.05E-06	1.52E-07	0	1.5E-07	0.396	1.34E-08	1.01E-08	6.70E-09	3.35E-09	No
Streoid	Prednisone	Turnagain Arm	4.04E-01	9.39E+03	4.30E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	17.076	1	1	7.35E-07	2.21E-08	0	2.2E-08	--	--	--	--	--	Uncertainty
Sulfonamide antibiotic	Sulfadiazine	Turnagain Arm	1.46E-03	9.39E+03	1.56E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.97E-09	5.90E-11	0	5.9E-11	6	3.44E-13	2.58E-13	1.72E-13	8.61E-14	No
Sulfonamide antibiotic	Sulfamethizole	Turnagain Arm	5.11E-03	9.39E+03	5.44E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	6.89E-09	2.07E-10	0	2.1E-10	14	5.16E-13	3.87E-13	2.58E-13	1.29E-13	No
Sulfonamide antibiotic	Sulfamethoxazole	Turnagain Arm	1.08E+00	9.39E+03	1.15E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.46E-06	4.37E-08	0	4.4E-08	9.2	1.66E-10	1.25E-10	8.31E-11	4.15E-11	No
Sulfonamide antibiotic	Sulfanilamide	Turnagain Arm	3.48E-02	9.39E+03	3.71E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	4.69E-08	1.41E-09	0	1.4E-09	12	4.10E-12	3.08E-12	2.05E-12	1.03E-12	No
SVOCs/PAHs	1,2-Diphenylhydrazine	Turnagain Arm	2.50E+00	9.39E+03	2.66E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	161.76	1.028	1.007	4.43E-05	1.33E-06	0	1.3E-06	--	--	--	--	--	Uncertainty
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	Turnagain Arm	1.00E-01	9.39E+03	1.07E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	2775.2	2.452	1.871	7.25E-05	2.18E-06	0	2.2E-06	65.6	1.16E-09	8.70E-10	5.80E-10	2.90E-10	No
SVOCs/PAHs	1-Methyldibenzothiophene	Turnagain Arm	5.00E-02	9.39E+03	5.33E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	2390	2.175	1.633	2.77E-05	8.31E-07	0	8.3E-07	65.6	4.43E-10	3.32E-10	2.22E-10	1.11E-10	No
SVOCs/PAHs	1-Methylfluorene	Turnagain Arm	5.00E-02	9.39E+03	5.33E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	3534	3.181	2.612	5.99E-05	1.80E-06	0	1.8E-06	65.6	9.59E-10	7.19E-10	4.79E-10	2.40E-10	No
SVOCs/PAHs	1-Methylnaphthalene	Turnagain Arm	4.27E-01	9.39E+03	4.55E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	664.4	1.202	1.054	3.63E-05	1.09E-06	0	1.1E-06	0.94	4.06E-08	3.04E-08	2.03E-08	1.01E-08	No
SVOCs/PAHs	1-Methylphenanthrene	Turnagain Arm	2.85E-02	9.39E+03	3.04E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	19132	3.643	3.162	2.12E-04	6.35E-06	0	6.3E-06	65.6	3.39E-09	2.54E-09	1.69E-09	8.47E-10	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Turnagain Arm	1.20E+00	9.39E+03	1.28E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	505.6	1.128	1.033	7.29E-05	2.19E-06	0	2.2E-06	3	2.55E-08	1.91E-08	1.28E-08	6.38E-09	No
SVOCs/PAHs	2,6-Dimethylnaphthalene	Turnagain Arm	3.44E-01	9.39E+03	3.67E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1296.4	1.491	1.178	7.09E-05	2.13E-06	0	2.1E-06	65.6	1.13E-09	8.51E-10	5.67E-10	2.84E-10	No
SVOCs/PAHs	2-Methylanthracene	Turnagain Arm	6.36E-02	9.39E+03	6.78E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	3698.8	3.181	2.612	7.97E-05	2.39E-06	0	2.4E-06	65.6	1.28E-09	9.57E-10	6.38E-10	3.19E-10	No
SVOCs/PAHs	2-Methylfluoranthene	Turnagain Arm	1.74E-02	9.39E+03	1.85E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	7672	6.266	7.079	8.91E-05	2.67E-06	0	2.7E-06	65.6	1.43E-09	1.07E-09	7.13E-10	3.57E-10	No
SVOCs/PAHs	2-Methylnaphthalene	Turnagain Arm	5.41E-01	9.39E+03	5.76E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	654.4	1.202	1.054	4.53E-05	1.36E-06	0	1.4E-06	65.6	7.26E-10	5.44E-10	3.63E-10	1.81E-10	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
SVOCs/PAHs	2-Methylphenanthrene	Turnagain Arm	6.47E-02	9.39E+03	6.89E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	13696	2.78	2.193	2.62E-04	7.87E-06	0	7.9E-06	65.6	4.20E-09	3.15E-09	2.10E-09	1.05E-09	No
SVOCs/PAHs	3,6-Dimethylphenanthrene	Turnagain Arm	1.89E-02	9.39E+03	2.01E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	33036	5.502	5.821	3.66E-04	1.10E-05	0	1.1E-05	65.6	5.86E-09	4.39E-09	2.93E-09	1.46E-09	No
SVOCs/PAHs	3-Methylphenanthrene	Turnagain Arm	5.79E-02	9.39E+03	6.17E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	13696	2.78	2.193	2.35E-04	7.05E-06	0	7.0E-06	65.6	3.76E-09	2.82E-09	1.88E-09	9.40E-10	No
SVOCs/PAHs	4-Methyldibenzothiophene	Turnagain Arm	2.29E-02	9.39E+03	2.44E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	2390	2.175	1.633	1.27E-05	3.81E-07	0	3.8E-07	65.6	2.03E-10	1.52E-10	1.02E-10	5.08E-11	No
SVOCs/PAHs	Acenaphthene	Turnagain Arm	8.21E-02	9.39E+03	8.75E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	716.8	1.202	1.054	7.54E-06	2.26E-07	0	2.3E-07	65.6	1.21E-10	9.05E-11	6.03E-11	3.02E-11	No
SVOCs/PAHs	Acenaphthylene	Turnagain Arm	1.25E-02	9.39E+03	1.33E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	739.2	1.202	1.054	1.18E-06	3.55E-08	0	3.6E-08	65.6	1.89E-11	1.42E-11	9.47E-12	4.74E-12	No
SVOCs/PAHs	Anthracene	Turnagain Arm	5.53E-02	9.39E+03	5.89E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1604	1.766	1.334	1.67E-05	5.01E-07	0	5.0E-07	65.6	2.67E-10	2.00E-10	1.34E-10	6.68E-11	No
SVOCs/PAHs	Benz(a)anthracene	Turnagain Arm	2.50E-01	9.39E+03	2.66E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	11736	8.841	12.05	2.76E-03	8.29E-05	0	8.3E-05	0.62	4.68E-06	3.51E-06	2.34E-06	1.17E-06	No
SVOCs/PAHs	Benzo(a)fluoranthene	Turnagain Arm	1.51E-02	9.39E+03	1.61E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12096	8.841	12.05	1.72E-04	5.16E-06	0	5.2E-06	0.615	2.94E-07	2.20E-07	1.47E-07	7.34E-08	No
SVOCs/PAHs	Benzo(a)pyrene	Turnagain Arm	5.63E-02	9.39E+03	6.00E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	20588	11.337	17.783	1.40E-03	4.20E-05	0	4.2E-05	0.62	2.37E-06	1.78E-06	1.19E-06	5.93E-07	No
SVOCs/PAHs	Benzo(b)fluoranthene	Turnagain Arm	4.90E-02	9.39E+03	5.22E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12096	8.841	12.05	5.58E-04	1.68E-05	0	1.7E-05	0.62	9.46E-07	7.09E-07	4.73E-07	2.36E-07	No
SVOCs/PAHs	Benzo(b)fluorene	Turnagain Arm	4.06E-02	9.39E+03	4.33E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	11916	8.841	12.05	4.56E-04	1.37E-05	0	1.4E-05	0.615	7.78E-07	5.84E-07	3.89E-07	1.95E-07	No
SVOCs/PAHs	Benzo(e)pyrene	Turnagain Arm	5.23E-02	9.39E+03	5.57E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	32976	13.228	23.281	2.43E-03	7.29E-05	0	7.3E-05	0.615	4.15E-06	3.11E-06	2.08E-06	1.04E-06	No
SVOCs/PAHs	Benzo(g,h,i)perylene	Turnagain Arm	8.33E-02	9.39E+03	8.88E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	44000	13.98	25.645	5.46E-03	1.64E-04	0	1.6E-04	14.4	3.98E-07	2.99E-07	1.99E-07	9.95E-08	No
SVOCs/PAHs	Benzo(k,j)fluoranthene	Turnagain Arm	3.34E-02	9.39E+03	3.56E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	19972	11.337	17.783	8.06E-04	2.42E-05	0	2.4E-05	0.615	1.38E-06	1.03E-06	6.88E-07	3.44E-07	No
SVOCs/PAHs	Benzothiophene	Turnagain Arm	1.44E-02	9.39E+03	1.53E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	212.64	1.034	1.007	3.37E-07	1.01E-08	0	1.0E-08	0.615	5.76E-10	4.32E-10	2.88E-10	1.44E-10	No
SVOCs/PAHs	Biphenyl	Turnagain Arm	1.02E-01	9.39E+03	1.09E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	822	1.253	1.072	1.12E-05	3.36E-07	0	3.4E-07	0.615	1.91E-08	1.43E-08	9.56E-09	4.78E-09	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Turnagain Arm	9.50E+01	9.39E+03	1.01E-02	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	6848	11.708	16.749	8.12E-01	2.43E-02	0	2.4E-02	18.3	4.66E-05	3.49E-05	2.33E-05	1.16E-05	No
SVOCs/PAHs	Butyl Benzyl Phthalate	Turnagain Arm	5.62E+00	9.39E+03	5.99E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	2454.4	2.175	1.633	3.20E-03	9.59E-05	0	9.6E-05	159	2.11E-08	1.58E-08	1.06E-08	5.28E-09	No
SVOCs/PAHs	Carbazole	Turnagain Arm	2.01E-01	9.39E+03	2.14E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	529.2	1.128	1.033	1.28E-05	3.84E-07	0	3.8E-07	0.615	2.18E-08	1.64E-08	1.09E-08	5.46E-09	No
SVOCs/PAHs	Chrysene/Triphenylene	Turnagain Arm	6.14E-02	9.39E+03	6.54E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12660	8.841	12.05	7.32E-04	2.20E-05	0	2.2E-05	0.615	1.25E-06	9.38E-07	6.25E-07	3.13E-07	No
SVOCs/PAHs	cis/trans Decalin	Turnagain Arm	4.84E-01	9.39E+03	5.16E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1091.2	1.38	1.13	7.77E-05	2.33E-06	0	2.3E-06	16.68	4.89E-09	3.67E-09	2.44E-09	1.22E-09	No
SVOCs/PAHs	Dibenzo(a,h)anthracene	Turnagain Arm	6.68E-03	9.39E+03	7.12E-07	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	38384	13.662	24.604	3.73E-04	1.12E-05	0	1.1E-05	2.66	1.47E-07	1.11E-07	7.37E-08	3.68E-08	No
SVOCs/PAHs	Dibenzofuran	Turnagain Arm	6.98E-02	9.39E+03	7.44E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	971.6	1.315	1.096	9.50E-06	2.85E-07	0	2.9E-07	0.615	1.62E-08	1.22E-08	8.11E-09	4.06E-09	No
SVOCs/PAHs	Dibenzothiophene	Turnagain Arm	3.35E-02	9.39E+03	3.57E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1442	1.614	1.242	8.31E-06	2.49E-07	0	2.5E-07	1.04	8.39E-09	6.29E-09	4.19E-09	2.10E-09	No
SVOCs/PAHs	Diethyl Phthalate	Turnagain Arm	3.70E+00	9.39E+03	3.94E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	73.4	1.01	1.002	2.92E-05	8.77E-07	0	8.8E-07	4600	6.67E-12	5.00E-12	3.34E-12	1.67E-12	No
SVOCs/PAHs	Dimethyl Phthalate	Turnagain Arm	1.20E-01	9.39E+03	1.28E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	21.124	1	1	2.70E-07	8.10E-09	0	8.1E-09	68	4.17E-12	3.13E-12	2.09E-12	1.04E-12	No
SVOCs/PAHs	Di-n-butyl Phthalate	Turnagain Arm	8.40E-01	9.39E+03	8.95E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1730.4	1.766	1.334	2.74E-04	8.21E-06	0	8.2E-06	1340	2.14E-10	1.61E-10	1.07E-10	5.36E-11	No
SVOCs/PAHs	Di-n-octyl Phthalate	Turnagain Arm	1.89E+01	9.39E+03	2.01E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	3895.6	7.278	6.012	5.71E-02	1.71E-03	0	1.7E-03	36.8	1.63E-06	1.22E-06	8.15E-07	4.07E-07	No
SVOCs/PAHs	Fluoranthene	Turnagain Arm	3.17E-01	9.39E+03	3.38E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	4716	4.188	3.873	6.67E-04	2.00E-05	0	2.0E-05	125	5.60E-09	4.20E-09	2.80E-09	1.40E-09	No
SVOCs/PAHs	Fluorene	Turnagain Arm	1.26E-01	9.39E+03	1.34E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	1064.4	1.38	1.13	1.97E-05	5.92E-07	0	5.9E-07	125	1.66E-10	1.24E-10	8.28E-11	4.14E-11	No
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	Turnagain Arm	4.44E-02	9.39E+03	4.73E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	48720	14.223	26.363	3.28E-03	9.83E-05	0	9.8E-05	7.2	4.78E-07	3.59E-07	2.39E-07	1.20E-07	No
SVOCs/PAHs	Isophorone	Turnagain Arm	3.80E-01	9.39E+03	4.05E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	24.588	1	1	9.96E-07	2.99E-08	0	3.0E-08	150	6.97E-12	5.23E-12	3.48E-12	1.74E-12	No
SVOCs/PAHs	Naphthalene	Turnagain Arm	9.80E-01	9.39E+03	1.04E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	279.52	1.053	1.012	3.07E-05	9.22E-07	0	9.2E-07	71	4.55E-10	3.41E-10	2.27E-10	1.14E-10	No
SVOCs/PAHs	Naphthobenzothiophene	Turnagain Arm	3.37E-02	9.39E+03	3.59E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	4936	4.188	3.873	7.42E-05	2.23E-06	0	2.2E-06	0.615	1.27E-07	9.51E-08	6.34E-08	3.17E-08	No
SVOCs/PAHs	N-Nitrosodimethylamine	Turnagain Arm	9.60E+00	9.39E+03	1.02E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.29E-05	3.88E-07	0	3.9E-07	0.005	2.72E-06	2.04E-06	1.36E-06	6.79E-07	No
SVOCs/PAHs	Pentachlorophenol (PCP)	Turnagain Arm	6.30E+00	9.39E+03	6.71E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	4440	3.643	3.162	1.09E-02	3.26E-04	0	3.3E-04	8.42	1.35E-06	1.02E-06	6.77E-07	3.39E-07	No
SVOCs/PAHs	Perylene	Turnagain Arm	3.33E-02	9.39E+03	3.55E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	24708	12.691	21.677	1.11E-03	3.34E-05	0	3.3E-05	0.615	1.90E-06	1.42E-06	9.50E-07	4.75E-07	No
SVOCs/PAHs	Phenanthrene	Turnagain Arm	9.80E-01	9.39E+03	1.04E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	7460	1.766	1.334	1.38E-03	4.13E-05	0	4.1E-05	65.6	2.20E-08	1.65E-08	1.10E-08	5.50E-09	No
SVOCs/PAHs	Phenol	Turnagain Arm	5.45E+01	9.39E+03	5.81E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	17.076	1	1	9.92E-05	2.97E-06	0	3.0E-06	60	1.74E-09	1.30E-09	8.68E-10	4.34E-10	No
SVOCs/PAHs	Pyrene	Turnagain Arm	4.70E-01	9.39E+03	5.01E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	3082.4	2.78	2.193	4.29E-04	1.29E-05	0	1.3E-05	0.615	7.33E-07	5.50E-07	3.66E-07	1.83E-07	No
SVOCs/PAHs	Retene	Turnagain Arm	1.08E-02	9.39E+03	1.15E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	131400	12.691	21.677	1.92E-03	5.76E-05	0	5.8E-05	65.6	3.07E-08	2.30E-08	1.54E-08	7.68E-09	No
Tetracycline antibiotic	Doxycycline	Turnagain Arm	1.50E-01	9.39E+03	1.60E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	2.02E-07	6.06E-09	0	6.1E-09	4.0298	5.27E-11	3.95E-11	2.63E-11	1.32E-11	No
Tetracycline antibiotic	Tetracycline [TC]	Turnagain Arm	9.79E-02	9.39E+03	1.04E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.32E-07	3.96E-09	0	4.0E-09	6.4	2.16E-11	1.62E-11	1.08E-11	5.41E-12	No
Tranquilizer	Meprobamate	Turnagain Arm	3.83E-01	9.39E+03	4.08E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	5.16E-07	1.55E-08	0	1.5E-08	3	1.81E-10	1.35E-10	9.03E-11	4.52E-11	No
Urinary steroid	Androsterone	Turnagain Arm	5.71E-02	9.39E+03	6.08E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	505.6	1.128	1.033	3.47E-06	1.04E-07	0	1.0E-07	200	1.82E-11	1.37E-11	9.11E-12	4.55E-12	No
VOCs	1,1,1-Trichloroethane (TCA)	Turnagain Arm	7.90E-01	9.39E+03	8.42E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	81.64	1.01	1.002	6.94E-06	2.08E-07	0	2.1E-07	999	7.30E-12	5.47E-12	3.65E-12	1.82E-12	No
VOCs	1,2-Dichloroethane (EDC)	Turnagain Arm	8.00E-02	9.39E+03	8.52E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	17.604	1	1	1.50E-07	4.50E-09	0	4.5E-09	382	4.12E-13	3.09E-13	2.06E-13	1.03E-13	No
VOCs	1,4-Dichlorobenzene	Turnagain Arm	8.40E-01	9.39E+03	8.95E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	345.76	1.067	1.014	3.30E-05	9.91E-07	0	9.9E-07	2.5	1.39E-08	1.04E-08	6.93E-09	3.47E-09	No
VOCs	2-Butanone (MEK)	Turnagain Arm	6.80E+01	9.39E+03	7.25E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	9.16E-05	2.75E-06	0	2.7E-06	1771	5.43E-11	4.08E-11	2.72E-11	1.36E-11	No
VOCs	2-Hexanone	Turnagain Arm	5.70E+00	9.39E+03	6.07E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	15.12	1	1	9.18E-06	2.75E-07	0	2.8E-07	8.27	1.17E-09	8.74E-10	5.83E-10	2.91E-10	No
VOCs	Acetone	Turnagain Arm	3.00E+02	9.39E+03	3.20E-02	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	4.04E-04	1.21E-05	0	1.2E-05	20	2.12E-08	1.59E-08	1.06E-08	5.31E-09	No
VOCs	Acrolein	Turnagain Arm	1.30E+00	9.39E+03	1.39E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	1.75E-06	5.26E-08	0	5.3E-08	0.05	3.68E-08	2.76E-08	1.84E-08	9.20E-09	No
VOCs	Benzene	Turnagain Arm	7.80E-01	9.39E+03	8.31E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	47.24	1.005	1	3.95E-06	1.18E-07	0	1.2E-07	26.36	1.57E-10	1.18E-10	7.86E-11	3.93E-11	No
VOCs	Bromodichloromethane	Turnagain Arm	8.00E-02	9.39E+03	8.52E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	38.784	1.005	1	3.32E-07	9.97E-09	0	1.0E-08	3.58	9.74E-11	7.31E-11	4.87E-11	2.44E-11	No
VOCs	Bromomethane	Turnagain Arm	9.00E-02	9.39E+03	9.59E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	11.328	1	1	1.09E-07	3.26E-09	0	3.3E-09	0.284	4.02E-10	3.01E-10	2.01E-10	1.00E-10	No
VOCs	Carbon Disulfide	Turnagain Arm	7.00E-01	9.39E+03	7.46E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	35.404	1	1	2.64E-06	7.92E-08	0	7.9E-08	11	2.52E-10	1.89E-10	1.26E-10	6.30E-11	No
VOCs	Chlorobenzene	Turnagain Arm	8.00E-02	9.39E+03	8.52E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	138.96	1.028	1.007	1.22E-06	3.65E-08	0	3.7E-08	19	6.73E-11	5.05E-11	3.36E-11	1.68E-11	No
VOCs	Chloroethane	Turnagain Arm	6.90E-01	9.39E+03	7.35E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	16.316	1	1	1.20E-06	3.60E-08	0	3.6E-08	--	--	--	--	--	Uncertainty
VOCs	Chloroform	Turnagain Arm	3.95E+00	9.39E+03	4.21E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	37.056	1	1	1.56E-05	4.68E-07	0	4.7E-07	2.58	6.35E-09	4.76E-09	3.17E-09	1.59E-09	No
VOCs	Chloromethane	Turnagain Arm	1.90E+00	9.39E+03	2.02E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.648	1	1	2.56E-06	7.68E-08	0	7.7E-08	3.2	8.40E-10	6.30E-10	4.20E-10	2.10E-10	No
VOCs	cis-1,2-Dichloroethene	Turnagain Arm	7.00E-02	9.39E+03	7.46E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	38.784	1.005	1	2.91E-07	8.72E-09	0	8.7E-09	90.4	3.38E-12	2.53E-12	1.69E-12	8.44E-13	No
VOCs	Dichloromethane (Methylene Chlori	Turnagain Arm	6.85E+00	9.39E+03	7.30E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	12.412	1	1	9.06E-06	2.72E-07	0	2.7E-07	5.85	1.63E-09	1.22E-09	8.13E-10	4.07E-10	No
VOCs	Ethylbenzene	Turnagain Arm	1.50E+00	9.39E+03	1.60E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	222.56	1.042	1.009	3.71E-05	1.11E-06	0	1.1E-06	97.1	4.01E-10	3.01E-10	2.00E-10	1.00E-10	No
VOCs	m,p-Xylenes	Turnagain Arm	6.20E+00	9.39E+03	6.61E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	226	1.042	1.009	1.56E-04	4.67E-06	0	4.7E-06	2.1	7.78E-08	5.83E-08	3.89E-08	1.94E-08	No
VOCs	o-Xylene	Turnagain Arm	2.60E+00	9.39E+03	2.77E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	225.96	1.042	1.009	6.52E-05	1.96E-06	0	2.0E-06	2.1	3.26E-08	2.45E-08	1.63E-08	8.15E-09	No
VOCs	Styrene	Turnagain Arm	5.50E+00	9.39E+03	5.86E-04	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	164.24	1.028	1.007	9.89E-05	2.97E-06	0	3.0E-06	200	5.19E-10	3.90E-10	2.60E-10	1.30E-10	No
VOCs	Tetrachloroethene (PCE)	Turnagain Arm	6.00E-01	9.39E+03	6.39E-05	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	325.36	1.067	1.014	2.22E-05	6.66E-07	0	6.7E-07	63	3.70E-10	2.77E-10	1.85E-10	9.25E-11	No
VOCs	Toluene	Turnagain Arm	1.60E+01	9.39E+03	1.70E-03	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	117.56	1.01	1.002	2.02E-04	6.07E-06	0	6.1E-06	26	8.17E-09	6.13E-09	4.09E-09	2.04E-09	No
VOCs	Trichloroethene (TCE)	Turnagain Arm	7.00E-02	9.39E+03	7.46E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	73.4	1.01	1.002	5.53E-07	1.66E-08	0	1.7E-08	2.8	2.07E-10	1.56E-10	1.04E-10	5.18E-11	No
VOCs	Vinyl Chloride	Turnagain Arm	2.00E-02	9.39E+03	2.13E-06	Beluga Whale	1428	0.03	0	0.0350	1	1	0	model	21.884	1	1	4.66E-08	1.40E-09	0	1.4E-09	0.17	2.88E-10	2.16E-10	1.44E-10	7.20E-11	No
Metals	Antimony	Turnagain Arm	9.04E-01	9.39E+03	9.63E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	4	1	1	3.85E-07	3.08E-08	0	3.1E-08	0.059	5.22E-07	3.92E-07	2.61E-07	1.31E-07	No
Metals	Arsenic	Turnagain Arm	3.42E+00	9.39E+03	3.64E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	176	1	1	6.41E-05	5.13E-06	0	5.1E-06	1.04	4.93E-06	3.70E-06	2.47E-06	1.23E-06	No
Metals	Beryllium	Turnagain Arm	1.80E-02	9.39E+03	1.92E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	76	1	1	1.46E-07	1.17E-08	0	1.2E-08	0.532	2.19E-08	1.64E-08	1.10E-08	5.48E-09	No
Metals	Cadmium	Turnagain Arm	3.09E-01	9.39E+03	3.29E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	152	1	1	5.00E-06	4.00E-07	0	4.0E-07	0.77	5.20E-07	3.90E-07	2.60E-07	1.30E-07	No
Metals	Chromium	Turnagain Arm	3.46E+00	9.39E+03	3.69E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	64	1	1	2.36E-05	1.89E-06	0	1.9E-06	2.4	7.87E-07	5.90E-07	3.93E-07	1.97E-07	No
Metals	Copper	Turnagain Arm	1.15E+02	9.39E+03	1.23E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	144	1	1	1.76E-03	1.41E-04	0	1.4E-04	5.6	2.52E-05	1.89E-05	1.26E-05	6.30E-06	No
Metals	Dissolved Antimony	Turnagain Arm	8.06E-01	9.39E+03	8.59E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	4	1	1	3.44E-07	2.75E-08	0	2.7E-08	0.059	4.66E-07	3.49E-07	2.33E-07	1.16E-07	No
Metals	Dissolved Arsenic	Turnagain Arm	2.78E+00	9.39E+03	2.96E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	176	1	1	5.21E-05	4.17E-06	0	4.2E-06	1.04	4.01E-06	3.01E-06	2.01E-06	1.00E-06	No
Metals	Dissolved Beryllium	Turnagain Arm	4.00E-03	9.39E+03	4.26E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	76	1	1	3.24E-08	2.59E-09	0	2.6E-09	0.532	4.87E-09	3.65E-09	2.44E-09	1.22E-09	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
Metals	Dissolved Cadmium	Turnagain Arm	2.10E-01	9.39E+03	2.24E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	152	1	1	3.40E-06	2.72E-07	0	2.7E-07	0.77	3.53E-07	2.65E-07	1.77E-07	8.83E-08	No
Metals	Dissolved Chromium	Turnagain Arm	3.63E+00	9.39E+03	3.87E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	64	1	1	2.48E-05	1.98E-06	0	2.0E-06	2.4	8.25E-07	6.19E-07	4.13E-07	2.06E-07	No
Metals	Dissolved Copper	Turnagain Arm	4.18E+01	9.39E+03	4.45E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	144	1	1	6.41E-04	5.13E-05	0	5.1E-05	5.6	9.16E-06	6.87E-06	4.58E-06	2.29E-06	No
Metals	Dissolved Lead	Turnagain Arm	1.54E+00	9.39E+03	1.64E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.08E-06	1.66E-07	0	1.7E-07	4.7	3.53E-08	2.65E-08	1.77E-08	8.83E-09	No
Metals	Dissolved Mercury	Turnagain Arm	8.94E-02	9.39E+03	9.53E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	25036	2.52	12.6	6.01E-04	4.81E-05	0	4.8E-05	1.41	3.41E-05	2.56E-05	1.70E-05	8.52E-06	No
Metals	Dissolved Molybdenum	Turnagain Arm	4.76E+01	9.39E+03	5.07E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	6.41E-05	5.13E-06	0	5.1E-06	0.52	9.87E-06	7.40E-06	4.93E-06	2.47E-06	No
Metals	Dissolved Nickel	Turnagain Arm	9.49E+00	9.39E+03	1.01E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	188	1	1	1.90E-04	1.52E-05	0	1.5E-05	1.7	8.95E-06	6.71E-06	4.47E-06	2.24E-06	No
Metals	Dissolved Selenium	Turnagain Arm	1.00E+00	9.39E+03	1.07E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.35E-06	1.08E-07	0	1.1E-07	0.143	7.54E-07	5.65E-07	3.77E-07	1.88E-07	No
Metals	Dissolved Silver	Turnagain Arm	4.22E-01	9.39E+03	4.50E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	5.69E-07	4.55E-08	0	4.5E-08	6.02	7.56E-09	5.67E-09	3.78E-09	1.89E-09	No
Metals	Dissolved Thallium	Turnagain Arm	3.20E-02	9.39E+03	3.41E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	4.31E-08	3.45E-09	0	3.5E-09	0.096	3.59E-08	2.70E-08	1.80E-08	8.98E-09	No
Metals	Dissolved Zinc	Turnagain Arm	1.24E+02	9.39E+03	1.32E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	188	1	1	2.48E-03	1.99E-04	0	2.0E-04	75.4	2.64E-06	1.98E-06	1.32E-06	6.59E-07	No
Metals	Lead	Turnagain Arm	4.80E+00	9.39E+03	5.11E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	6.47E-06	5.18E-07	0	5.2E-07	4.7	1.10E-07	8.26E-08	5.51E-08	2.75E-08	No
Metals	Mercury	Turnagain Arm	1.14E-01	9.39E+03	1.21E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	25036	2.52	12.6	7.66E-04	6.13E-05	0	6.1E-05	1.41	4.35E-05	3.26E-05	2.17E-05	1.09E-05	No
Metals	Molybdenum	Turnagain Arm	4.87E+01	9.39E+03	5.19E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	6.56E-05	5.25E-06	0	5.3E-06	0.52	1.01E-05	7.57E-06	5.05E-06	2.52E-06	No
Metals	Nickel	Turnagain Arm	6.70E+00	9.39E+03	7.14E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	188	1	1	1.34E-04	1.07E-05	0	1.1E-05	1.7	6.32E-06	4.74E-06	3.16E-06	1.58E-06	No
Metals	Selenium	Turnagain Arm	1.20E+00	9.39E+03	1.28E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	19.52	1	1	2.50E-06	2.00E-07	0	2.0E-07	0.143	1.40E-06	1.05E-06	6.98E-07	3.49E-07	No
Metals	Silver	Turnagain Arm	4.90E-01	9.39E+03	5.22E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2	1	1	1.04E-07	8.35E-09	0	8.4E-09	6.02	1.39E-09	1.04E-09	6.94E-10	3.47E-10	No
Metals	Thallium	Turnagain Arm	5.20E-02	9.39E+03	5.54E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	464	1	1	2.57E-06	2.06E-07	0	2.1E-07	0.096	2.14E-06	1.61E-06	1.07E-06	5.36E-07	No
Metals	Zinc	Turnagain Arm	1.65E+02	9.39E+03	1.76E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	188	1	1	3.31E-03	2.64E-04	0	2.6E-04	75.4	3.51E-06	2.63E-06	1.75E-06	8.77E-07	No
Cyanide	Cyanide, Total	Turnagain Arm	9.00E+00	9.39E+03	9.59E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.21E-05	9.70E-07	0	9.7E-07	0.38	2.55E-06	1.92E-06	1.28E-06	6.38E-07	No
ACE inhibitor	Enalapril	Turnagain Arm	1.21E-02	9.39E+03	1.29E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.63E-08	1.30E-09	0	1.3E-09	8	1.63E-10	1.22E-10	8.15E-11	4.08E-11	No
Ammonia	Total Ammonia	Turnagain Arm	3.30E+04	9.39E+03	3.52E+00	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	4.45E-02	3.56E-03	0	3.6E-03	--	--	--	--	--	Uncertainty
Anabolic agent	Androstenedione	Turnagain Arm	1.62E-01	9.39E+03	1.73E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	121.2	1.028	1.007	2.15E-06	1.72E-07	0	1.7E-07	12	1.43E-08	1.08E-08	7.17E-09	3.58E-09	No
Analgesic	Ibuprofen	Turnagain Arm	2.09E+01	9.39E+03	2.23E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.253	1.072	3.53E-05	2.82E-06	0	2.8E-06	1.98	1.43E-06	1.07E-06	7.13E-07	3.56E-07	No
Analgesic (Ibuprofen metabolite)	2-Hydroxy-ibuprofen	Turnagain Arm	3.87E+01	9.39E+03	4.12E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.01	1.002	5.27E-05	4.21E-06	0	4.2E-06	5.02	8.39E-07	6.30E-07	4.20E-07	2.10E-07	No
Anti-acid reflux	Ranitidine	Turnagain Arm	8.44E-02	9.39E+03	8.99E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.14E-07	9.10E-09	0	9.1E-09	--	--	--	--	--	Uncertainty
Antiasthmatic	Albuterol	Turnagain Arm	2.01E-02	9.39E+03	2.14E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.71E-08	2.17E-09	0	2.2E-09	8	2.71E-10	2.03E-10	1.35E-10	6.77E-11	No
Antiasthmatic	Theophylline	Turnagain Arm	5.11E+01	9.39E+03	5.44E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	6.89E-05	5.51E-06	0	5.5E-06	0.9	6.12E-06	4.59E-06	3.06E-06	1.53E-06	No
Antibacterial	Penicillin V	Turnagain Arm	1.34E-02	9.39E+03	1.43E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.005	1	1.81E-08	1.45E-09	0	1.5E-09	14	1.04E-10	7.78E-11	5.19E-11	2.59E-11	No
Antibiotic	4-Epitetracycline [ETC]	Turnagain Arm	6.62E-02	9.39E+03	7.05E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	8.92E-08	7.14E-09	0	7.1E-09	6.4	1.12E-09	8.36E-10	5.58E-10	2.79E-10	No
Antibiotic	Enrofloxacin	Turnagain Arm	7.08E-04	9.39E+03	7.54E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	9.54E-10	7.63E-11	0	7.6E-11	2	3.82E-11	2.86E-11	1.91E-11	9.54E-12	No
Anticonvulsant	Benztropine	Turnagain Arm	1.05E-03	9.39E+03	1.12E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1245.2	1.491	1.178	2.08E-07	1.66E-08	0	1.7E-08	0.1	1.66E-07	1.25E-07	8.31E-08	4.15E-08	No
Anticonvulsant	Carbamazepine	Turnagain Arm	5.06E-01	9.39E+03	5.39E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	76.84	1.01	1.002	4.18E-06	3.35E-07	0	3.3E-07	2.116	1.58E-07	1.19E-07	7.91E-08	3.95E-08	No
Antidepressant	10-hydroxy-amitriptyline	Turnagain Arm	1.92E-02	9.39E+03	2.05E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	330.56	1.067	1.014	7.22E-07	5.77E-08	0	5.8E-08	--	--	--	--	--	Uncertainty
Antidepressant	Amitriptyline	Turnagain Arm	7.46E-02	9.39E+03	7.95E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3275.6	2.78	2.193	7.24E-05	5.79E-06	0	5.8E-06	0.28	2.07E-05	1.55E-05	1.03E-05	5.17E-06	No
Antidiabetic drug	Glipizide	Turnagain Arm	1.07E-02	9.39E+03	1.14E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	33.828	1	1	3.86E-08	3.09E-09	0	3.1E-09	--	--	--	--	--	Uncertainty
Antidiabetic drug	Glyburide	Turnagain Arm	1.85E-02	9.39E+03	1.97E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2689.2	2.452	1.871	1.30E-05	1.04E-06	0	1.0E-06	13	8.00E-08	6.00E-08	4.00E-08	2.00E-08	No
Antidiabetic drug	Metformin	Turnagain Arm	8.93E+01	9.39E+03	9.52E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.20E-04	9.63E-06	0	9.6E-06	0.92	1.05E-05	7.85E-06	5.23E-06	2.62E-06	No
Antifungal agent	Miconazole	Turnagain Arm	5.62E-02	9.39E+03	5.99E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	24768	12.691	21.677	1.88E-03	1.51E-04	0	1.5E-04	2.076	7.25E-05	5.44E-05	3.63E-05	1.81E-05	No
Antihistamine	Diphenhydramine	Turnagain Arm	1.68E+00	9.39E+03	1.79E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	267.04	1.053	1.012	5.03E-05	4.03E-06	0	4.0E-06	2	2.01E-06	1.51E-06	1.01E-06	5.03E-07	No
Antihistamine	Promethazine	Turnagain Arm	3.35E-02	9.39E+03	3.57E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2771.2	2.452	1.871	2.43E-05	1.94E-06	0	1.9E-06	0.22	8.82E-06	6.61E-06	4.41E-06	2.20E-06	No
Antihypertensive	Diltiazem	Turnagain Arm	4.06E-01	9.39E+03	4.33E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	112.32	1.01	1.002	4.91E-06	3.93E-07	0	3.9E-07	2.96	1.33E-07	9.95E-08	6.63E-08	3.32E-08	No
Antihypertensive	Valsartan	Turnagain Arm	1.58E+01	9.39E+03	1.68E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	400	1.128	1.033	7.60E-04	6.08E-05	0	6.1E-05	--	--	--	--	--	Uncertainty
Antihypertensive	Verapamil	Turnagain Arm	5.12E-02	9.39E+03	5.46E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	588.4	1.161	1.042	3.73E-06	2.98E-07	0	3.0E-07	0.456	6.54E-07	4.90E-07	3.27E-07	1.63E-07	No
Antilipemic	Gemfibrozil	Turnagain Arm	1.33E+00	9.39E+03	1.42E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	2.452	1.871	4.40E-06	3.52E-07	0	3.5E-07	12.648	2.78E-08	2.08E-08	1.39E-08	6.95E-09	No
Antimicrobial, disinfectant	Triclocarban	Turnagain Arm	4.89E-03	9.39E+03	5.21E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3186	2.78	2.193	4.61E-06	3.69E-07	0	3.7E-07	138.4	2.67E-09	2.00E-09	1.33E-09	6.67E-10	No
Antimicrobial, disinfectant	Triclosan	Turnagain Arm	4.31E+00	9.39E+03	4.59E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2568.8	2.452	1.871	2.89E-03	2.31E-04	0	2.3E-04	6	3.86E-05	2.89E-05	1.93E-05	9.64E-06	No
Antipyretic, analgesic	Acetaminophen	Turnagain Arm	1.22E+02	9.39E+03	1.30E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.64E-04	1.32E-05	0	1.3E-05	66.66	1.97E-07	1.48E-07	9.87E-08	4.93E-08	No
Antispasmodic, caffeine metabolite	1,7-Dimethylxanthine	Turnagain Arm	5.78E+01	9.39E+03	6.16E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	7.79E-05	6.23E-06	0	6.2E-06	--	--	--	--	--	Uncertainty
Betablocker	Atenolol	Turnagain Arm	1.88E+00	9.39E+03	2.00E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.53E-06	2.03E-07	0	2.0E-07	8	2.53E-08	1.90E-08	1.27E-08	6.33E-09	No
Betablocker	Metoprolol	Turnagain Arm	4.89E-01	9.39E+03	5.21E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	17.944	1	1	9.35E-07	7.48E-08	0	7.5E-08	4.632	1.61E-08	1.21E-08	8.07E-09	4.04E-09	No
Betablocker	Propranolol	Turnagain Arm	7.48E-02	9.39E+03	7.97E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	203.96	1.083	1.019	1.76E-06	1.41E-07	0	1.4E-07	1.28	1.10E-07	8.25E-08	5.50E-08	2.75E-08	No
BloodThinner	Warfarin	Turnagain Arm	4.03E-03	9.39E+03	4.29E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	112.32	1.01	1.002	4.87E-08	3.90E-09	0	3.9E-09	0.0064	6.09E-07	4.57E-07	3.04E-07	1.52E-07	No
ChannelBlocker	Amlodipine	Turnagain Arm	2.48E-02	9.39E+03	2.64E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	177.2	1.028	1.007	4.81E-07	3.85E-08	0	3.9E-08	2	1.93E-08	1.44E-08	9.63E-09	4.81E-09	No
ChannelBlocker	Dehydronifedipine	Turnagain Arm	1.40E-03	9.39E+03	1.49E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	222.96	1.042	1.009	3.47E-08	2.77E-09	0	2.8E-09	--	--	--	--	--	Uncertainty
ChannelBlocker	Desmethyldiltiazem	Turnagain Arm	8.36E-02	9.39E+03	8.91E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	112.32	1.01	1.002	1.01E-06	8.08E-08	0	8.1E-08	--	--	--	--	--	Uncertainty
ChannelBlocker	Norverapamil	Turnagain Arm	1.89E-02	9.39E+03	2.01E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1970.4	1.95	1.459	7.74E-06	6.19E-07	0	6.2E-07	0.032	1.93E-05	1.45E-05	9.67E-06	4.84E-06	No
Cocaine metabolite	Benzoylecgonine	Turnagain Arm	1.96E+00	9.39E+03	2.09E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.64E-06	2.11E-07	0	2.1E-07	0.3804	5.56E-07	4.17E-07	2.78E-07	1.39E-07	No
Contraceptive	Norgestrel	Turnagain Arm	8.18E-02	9.39E+03	8.72E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	367.32	1.083	1.019	3.47E-06	2.77E-07	0	2.8E-07	20.04	1.38E-08	1.04E-08	6.92E-09	3.46E-09	No
Corticosteroid	Hydrocortisone	Turnagain Arm	7.82E-01	9.39E+03	8.33E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	21.444	1	1	1.79E-06	1.43E-07	0	1.4E-07	0.6	2.38E-07	1.79E-07	1.19E-07	5.96E-08	No
Depressant	Alprazolam	Turnagain Arm	3.23E-03	9.39E+03	3.44E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	46.56	1.005	1	1.61E-08	1.29E-09	0	1.3E-09	2.16	5.96E-10	4.47E-10	2.98E-10	1.49E-10	No
Depressant	Diazepam	Turnagain Arm	8.27E-04	9.39E+03	8.81E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	134.8	1.028	1.007	1.22E-08	9.77E-10	0	9.8E-10	1.112	8.78E-10	6.59E-10	4.39E-10	2.20E-10	No
Diuretic	Furosemide	Turnagain Arm	2.08E-01	9.39E+03	2.22E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.005	1	2.82E-07	2.25E-08	0	2.3E-08	10.4	2.17E-09	1.63E-09	1.08E-09	5.42E-10	No
Diuretic	Hydrochlorothiazide	Turnagain Arm	1.07E+00	9.39E+03	1.14E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.44E-06	1.15E-07	0	1.2E-07	12.32	9.36E-09	7.02E-09	4.68E-09	2.34E-09	No
Diuretic	Triamterene	Turnagain Arm	9.41E-02	9.39E+03	1.00E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.27E-07	1.01E-08	0	1.0E-08	1.6	6.34E-09	4.76E-09	3.17E-09	1.59E-09	No
Fungicide and parasiticide	Thiabendazole	Turnagain Arm	3.06E-02	9.39E+03	3.26E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	79.2	1.01	1.002	2.61E-07	2.09E-08	0	2.1E-08	5.2	4.01E-09	3.01E-09	2.01E-09	1.00E-09	No
Glycoside	Digoxin	Turnagain Arm	7.01E-02	9.39E+03	7.47E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.6	1	1	9.41E-08	7.53E-09	0	7.5E-09	0.07112	1.06E-07	7.94E-08	5.29E-08	2.65E-08	No
Lincosamide antibiotic	Lincomycin	Turnagain Arm	4.35E-02	9.39E+03	4.64E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	5.86E-08	4.69E-09	0	4.7E-09	3.132	1.50E-09	1.12E-09	7.49E-10	3.74E-10	No
Macrolide antibiotic	Azithromycin	Turnagain Arm	3.41E-01	9.39E+03	3.63E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	834.4	1.253	1.072	3.80E-05	3.04E-06	0	3.0E-06	12	2.53E-07	1.90E-07	1.27E-07	6.33E-08	No
Macrolide antibiotic	Clarithromycin	Turnagain Arm	1.65E-01	9.39E+03	1.76E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	225.96	1.042	1.009	4.14E-06	3.31E-07	0	3.3E-07	5.08	6.52E-08	4.89E-08	3.26E-08	1.63E-08	No
Macrolide antibiotic	Erythromycin-H2O	Turnagain Arm	1.68E-01	9.39E+03	1.79E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	194.12	1.034	1.007	3.59E-06	2.87E-07	0	2.9E-07	10.32	2.79E-08	2.09E-08	1.39E-08	6.96E-09	No
Macrolide antibiotic	Roxithromycin	Turnagain Arm	9.41E-04	9.39E+03	1.00E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	121.36	1.028	1.007	1.25E-08	1.00E-09	0	1.0E-09	0.8	1.25E-09	9.38E-10	6.25E-10	3.13E-10	No
Macrolide antibiotic	Tylosin	Turnagain Arm	1.43E-03	9.39E+03	1.52E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	22.108	1	1	3.37E-09	2.69E-10	0	2.7E-10	3.2	8.42E-11	6.32E-11	4.21E-11	2.11E-11	No
Nicotinemetabolite	Cotinine	Turnagain Arm	2.80E+00	9.39E+03	2.98E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	3.77E-06	3.02E-07	0	3.0E-07	6.416	4.71E-08	3.53E-08	2.35E-08	1.18E-08	No
Non-steroidalanti-inflammatory dr	Naproxen	Turnagain Arm	1.24E+01	9.39E+03	1.32E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.042	1.009	1.74E-05	1.39E-06	0	1.4E-06	4.936	2.82E-07	2.12E-07	1.41E-07	7.06E-08	No
Oil & Grease	Oil and Grease, Total (HEM)	Turnagain Arm	4.27E+04	9.39E+03	4.55E+00	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	0	0	0	0.00E+00	0.00E+00	0	0.0E+00	--	--	--	--	--	Uncertainty
Opiate	Codeine	Turnagain Arm	1.52E-01	9.39E+03	1.62E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	11.328	1	1	1.83E-07	1.47E-08	0	1.5E-08	1.708	8.59E-09	6.45E-09	4.30E-09	2.15E-09	No
Opiate	Hydrocodone	Turnagain Arm	6.87E-02	9.39E+03	7.32E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	49.8	1.005	1	3.66E-07	2.93E-08	0	2.9E-08	1.5	1.95E-08	1.47E-08	9.77E-09	4.88E-09	No
Opiate	Oxycodone	Turnagain Arm	1.60E-01	9.39E+03	1.70E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.16E-07	1.73E-08	0	1.7E-08	1.28	1.35E-08	1.01E-08	6.74E-09	3.37E-09	No
Opiod	Propoxyphene	Turnagain Arm	1.02E-02	9.39E+03	1.09E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1064.4	1.38	1.13	1.60E-06	1.28E-07	0	1.3E-07	0.54	2.37E-07	1.77E-07	1.18E-07	5.91E-08	No

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption								Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
PBDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE (BDE-2	Turnagain Arm	2.58E-02	9.39E+03	2.75E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	166.84	1.493	0.226	6.85E-07	5.48E-08	0	5.5E-08	2.22	2.47E-08	1.85E-08	1.23E-08	6.17E-09	No
PBDEs	2,2',3,3',4,4',5,6,6'-NoBDE	Turnagain Arm	5.24E-03	9.39E+03	5.58E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	60560	14.355	26.669	4.85E-04	3.88E-05	0	3.9E-05	0.5	7.77E-05	5.82E-05	3.88E-05	1.94E-05	No
PBDEs	2,2',3,4,4',5,5',6-OcBDE	Turnagain Arm	1.41E-03	9.39E+03	1.50E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	7728	2.732	0.778	3.17E-06	2.54E-07	0	2.5E-07	0.07	3.63E-06	2.72E-06	1.81E-06	9.06E-07	No
PBDEs	2,2',3,4,4',5',6-HpBDE	Turnagain Arm	6.87E-04	9.39E+03	7.32E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3393.2	1.493	0.226	3.71E-07	2.97E-08	0	3.0E-08	0.07	4.24E-07	3.18E-07	2.12E-07	1.06E-07	No
PBDEs	2,2',3,4,4',5'-HxBDE	Turnagain Arm	4.94E-04	9.39E+03	5.26E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	9264	3.296	1.146	1.61E-06	1.29E-07	0	1.3E-07	0.07	1.84E-06	1.38E-06	9.18E-07	4.59E-07	No
PBDEs	2,2',3,4,4',6'-HxBDE	Turnagain Arm	1.54E-04	9.39E+03	1.64E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	9264	3.296	1.146	5.01E-07	4.01E-08	0	4.0E-08	0.07	5.73E-07	4.29E-07	2.86E-07	1.43E-07	No
PBDEs	2,2',3,4,4'-PeBDE	Turnagain Arm	1.82E-03	9.39E+03	1.94E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	25280	10.914	14.388	5.35E-05	4.28E-06	0	4.3E-06	0.07	6.11E-05	4.59E-05	3.06E-05	1.53E-05	No
PBDEs	2,2',4,4',5,5'-HxBDE	Turnagain Arm	3.60E-03	9.39E+03	3.84E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	9264	3.296	1.146	1.17E-05	9.37E-07	0	9.4E-07	0.07	1.34E-05	1.00E-05	6.69E-06	3.35E-06	No
PBDEs	2,2',4,4',5,6'-HxBDE	Turnagain Arm	3.05E-03	9.39E+03	3.25E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	9264	3.296	1.146	9.92E-06	7.94E-07	0	7.9E-07	0.07	1.13E-05	8.51E-06	5.67E-06	2.84E-06	No
PBDEs	2,2',4,4',5-PeBDE (BDE-99)	Turnagain Arm	4.06E-02	9.39E+03	4.33E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	60560	14.355	26.669	3.76E-03	3.01E-04	0	3.0E-04	0.058	5.19E-03	3.89E-03	2.59E-03	1.30E-03	No
PBDEs	2,2',4,4',6,6'-HxBDE	Turnagain Arm	2.13E-04	9.39E+03	2.27E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	9264	3.296	1.146	6.93E-07	5.54E-08	0	5.5E-08	0.07	7.92E-07	5.94E-07	3.96E-07	1.98E-07	No
PBDEs	2,2',4,4',6-PeBDE	Turnagain Arm	8.11E-03	9.39E+03	8.64E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	25280	10.914	14.388	2.38E-04	1.91E-05	0	1.9E-05	0.07	2.72E-04	2.04E-04	1.36E-04	6.81E-05	No
PBDEs	2,2',4,4'-TeBDE (BDE-47)	Turnagain Arm	4.32E-02	9.39E+03	4.60E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	54400	14.355	26.669	3.59E-03	2.88E-04	0	2.9E-04	0.07	4.11E-03	3.08E-03	2.05E-03	1.03E-03	No
PBDEs	2,2',4,5'-TeBDE	Turnagain Arm	1.56E-03	9.39E+03	1.66E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	54400	14.355	26.669	1.30E-04	1.04E-05	0	1.0E-05	0.07	1.48E-04	1.11E-04	7.42E-05	3.71E-05	No
PBDEs	2,2',4,6'-TeBDE	Turnagain Arm	2.40E-04	9.39E+03	2.56E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	54400	14.355	26.669	2.00E-05	1.60E-06	0	1.6E-06	0.07	2.28E-05	1.71E-05	1.14E-05	5.71E-06	No
PBDEs	2,2',4-TriBDE	Turnagain Arm	1.11E-03	9.39E+03	1.18E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	14076	9.716	13.964	1.62E-05	1.29E-06	0	1.3E-06	0.07	1.85E-05	1.39E-05	9.24E-06	4.62E-06	No
PBDEs	2,3',4,4',6-PeBDE	Turnagain Arm	2.02E-04	9.39E+03	2.15E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	25280	10.914	14.388	5.94E-06	4.75E-07	0	4.8E-07	0.07	6.79E-06	5.09E-06	3.39E-06	1.70E-06	No
PBDEs	2,3',4,4'-TeBDE	Turnagain Arm	1.50E-03	9.39E+03	1.60E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	54400	14.355	26.669	1.25E-04	9.99E-06	0	1.0E-05	0.07	1.43E-04	1.07E-04	7.13E-05	3.57E-05	No
PBDEs	2,3',4',6-TeBDE	Turnagain Arm	5.58E-04	9.39E+03	5.95E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	54400	14.355	26.669	4.64E-05	3.71E-06	0	3.7E-06	0.07	5.31E-05	3.98E-05	2.65E-05	1.33E-05	No
PBDEs	2,4,4'-TriBDE	Turnagain Arm	1.35E-03	9.39E+03	1.44E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	14076	9.716	13.964	1.97E-05	1.57E-06	0	1.6E-06	0.07	2.25E-05	1.69E-05	1.12E-05	5.62E-06	No
Pesticides	2,4'-DDD	Turnagain Arm	1.07E-03	9.39E+03	1.14E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	13944	9.716	13.964	1.54E-05	1.24E-06	0	1.2E-06	0.147	8.41E-06	6.30E-06	4.20E-06	2.10E-06	No
Pesticides	4,4'-DDD	Turnagain Arm	2.10E-02	9.39E+03	2.24E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	17420	10.556	15.996	4.11E-04	3.29E-05	0	3.3E-05	0.147	2.24E-04	1.68E-04	1.12E-04	5.60E-05	No
Pesticides	4,4'-DDE	Turnagain Arm	4.70E-03	9.39E+03	5.01E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	36672	13.662	24.604	2.51E-04	2.01E-05	0	2.0E-05	0.147	1.37E-04	1.02E-04	6.83E-05	3.41E-05	No
Pesticides	4,4'-DDT	Turnagain Arm	1.86E-04	9.39E+03	1.98E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	67360	14.388	26.669	1.92E-05	1.54E-06	0	1.5E-06	0.147	1.05E-05	7.84E-06	5.23E-06	2.61E-06	No
Pesticides	Aldrin	Turnagain Arm	9.70E-03	9.39E+03	1.03E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	36120	13.662	24.604	5.10E-04	4.08E-05	0	4.1E-05	0.2	2.04E-04	1.53E-04	1.02E-04	5.10E-05	No
Pesticides	Chlordane, alpha (cis)	Turnagain Arm	1.42E-04	9.39E+03	1.51E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	23604	12.064	19.907	4.31E-06	3.45E-07	0	3.4E-07	0.15	2.30E-06	1.72E-06	1.15E-06	5.74E-07	No
Pesticides	Chlorpyriphos	Turnagain Arm	9.72E-04	9.39E+03	1.04E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3480.8	3.181	2.612	1.15E-06	9.17E-08	0	9.2E-08	0.1	9.17E-07	6.88E-07	4.59E-07	2.29E-07	No
Pesticides	Chlorpyriphos-Methyl	Turnagain Arm	2.11E-04	9.39E+03	2.25E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1296.4	1.491	1.178	4.35E-08	3.48E-09	0	3.5E-09	0.1	3.48E-08	2.61E-08	1.74E-08	8.69E-09	No
Pesticides	Cypermethrin	Turnagain Arm	4.05E-03	9.39E+03	4.32E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3881.2	14.388	26.669	2.41E-05	1.93E-06	0	1.9E-06	0.2	9.64E-06	7.23E-06	4.82E-06	2.41E-06	No
Pesticides	DEET	Turnagain Arm	6.36E+00	9.39E+03	6.78E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	51	1.005	1	3.47E-05	2.78E-06	0	2.8E-06	1	2.78E-06	2.08E-06	1.39E-06	6.95E-07	No
Pesticides	Demeton-O,S	Turnagain Arm	3.80E-02	9.39E+03	4.05E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	38.352	1	1	1.55E-07	1.24E-08	0	1.2E-08	0.008	1.55E-06	1.16E-06	7.76E-07	3.88E-07	No
Pesticides	Dieldrin	Turnagain Arm	1.40E-02	9.39E+03	1.49E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	5012	4.188	3.873	3.13E-05	2.50E-06	0	2.5E-06	0.015	1.67E-04	1.25E-04	8.35E-05	4.17E-05	No
Pesticides	Endosulfan Sulfate	Turnagain Arm	2.20E-02	9.39E+03	2.34E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	482.8	1.128	1.033	1.28E-06	1.02E-07	0	1.0E-07	0.058	1.76E-06	1.32E-06	8.80E-07	4.40E-07	No
Pesticides	Endrin	Turnagain Arm	6.20E-05	9.39E+03	6.61E-09	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	5012	4.188	3.873	1.39E-07	1.11E-08	0	1.1E-08	0.184	6.03E-08	4.52E-08	3.01E-08	1.51E-08	No
Pesticides	Endrin Ketone	Turnagain Arm	9.60E-03	9.39E+03	1.02E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3623.2	3.181	2.612	1.18E-05	9.43E-07	0	9.4E-07	0.184	5.13E-06	3.84E-06	2.56E-06	1.28E-06	No
Pesticides	HCH, alpha	Turnagain Arm	6.60E-05	9.39E+03	7.03E-09	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1001.6	1.315	1.096	9.26E-09	7.41E-10	0	7.4E-10	87	8.52E-12	6.39E-12	4.26E-12	2.13E-12	No
Pesticides	HCH, beta	Turnagain Arm	1.09E-04	9.39E+03	1.16E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1001.6	1.315	1.096	1.53E-08	1.22E-09	0	1.2E-09	0.4	3.06E-09	2.29E-09	1.53E-09	7.65E-10	No
Pesticides	HCH, gamma	Turnagain Arm	6.96E-04	9.39E+03	7.42E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1001.6	1.315	1.096	9.77E-08	7.81E-09	0	7.8E-09	0.014	5.58E-07	4.19E-07	2.79E-07	1.40E-07	No
Pesticides	Heptachlor	Turnagain Arm	1.40E-02	9.39E+03	1.49E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	7552	6.266	7.079	7.06E-05	5.65E-06	0	5.6E-06	0.2	2.82E-05	2.12E-05	1.41E-05	7.06E-06	No
Pesticides	Hexachlorobenzene	Turnagain Arm	5.17E-04	9.39E+03	5.51E-08	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	11212	7.962	10.209	4.92E-06	3.93E-07	0	3.9E-07	7.1	5.54E-08	4.16E-08	2.77E-08	1.39E-08	No
Pesticides	Malathion	Turnagain Arm	5.20E-01	9.39E+03	5.54E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	67	1.01	1.002	3.75E-06	3.00E-07	0	3.0E-07	0.046	6.52E-06	4.89E-06	3.26E-06	1.63E-06	No
Pesticides	Methoxychlor	Turnagain Arm	2.90E-03	9.39E+03	3.09E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	4176	3.643	3.162	4.70E-06	3.76E-07	0	3.8E-07	1.002	3.75E-07	2.81E-07	1.88E-07	9.38E-08	No
Pesticides	Permethrin	Turnagain Arm	4.23E-02	9.39E+03	4.51E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1989.2	13.662	24.604	1.22E-04	9.80E-06	0	9.8E-06	5	1.96E-06	1.47E-06	9.80E-07	4.90E-07	No
PFAS	5:3 FTCA	Turnagain Arm	5.92E-02	9.39E+03	6.31E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.766	1.334	1.41E-07	1.13E-08	0	1.1E-08	5	2.25E-09	1.69E-09	1.13E-09	5.64E-10	No
PFAS	PFBA	Turnagain Arm	1.49E-02	9.39E+03	1.59E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.005	1	2.02E-08	1.61E-09	0	1.6E-09	35	4.61E-11	3.46E-11	2.31E-11	1.15E-11	No
PFAS	PFHpA	Turnagain Arm	8.47E-03	9.39E+03	9.03E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.315	1.096	1.50E-08	1.20E-09	0	1.2E-09	--	--	--	--	--	Uncertainty
PFAS	PFHxA	Turnagain Arm	2.55E-02	9.39E+03	2.72E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.083	1.019	3.72E-08	2.98E-09	0	3.0E-09	20	1.49E-10	1.12E-10	7.44E-11	3.72E-11	No
PFAS	PFHxS	Turnagain Arm	3.96E-02	9.39E+03	4.22E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.042	1.009	5.56E-08	4.45E-09	0	4.4E-09	5.72	7.78E-10	5.83E-10	3.89E-10	1.94E-10	No
PFAS	PFNA	Turnagain Arm	5.14E-03	9.39E+03	5.48E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	40	6.266	7.079	1.37E-07	1.10E-08	0	1.1E-08	0.166	6.62E-08	4.96E-08	3.31E-08	1.65E-08	No
PFAS	PFOA	Turnagain Arm	1.85E-02	9.39E+03	1.97E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	2.452	1.871	6.11E-08	4.89E-09	0	4.9E-09	1.75	2.79E-09	2.10E-09	1.40E-09	6.99E-10	No
PFAS	PFOS	Turnagain Arm	6.53E-02	9.39E+03	6.96E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.766	1.334	1.55E-07	1.24E-08	0	1.2E-08	0.12	1.04E-07	7.77E-08	5.18E-08	2.59E-08	No
PFAS	PFPeA	Turnagain Arm	2.03E-02	9.39E+03	2.16E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.028	1.007	2.81E-08	2.25E-09	0	2.2E-09	--	--	--	--	--	Uncertainty
PFAS	PFPeS	Turnagain Arm	3.84E-03	9.39E+03	4.09E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1.01	1.002	5.23E-09	4.18E-10	0	4.2E-10	--	--	--	--	--	Uncertainty
Plasticizer	Bisphenol A	Turnagain Arm	1.59E+00	9.39E+03	1.69E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	288.12	1.053	1.012	5.14E-05	4.11E-06	0	4.1E-06	10	4.11E-07	3.08E-07	2.06E-07	1.03E-07	No
Plasticizer	Bisphenol S	Turnagain Arm	8.88E-01	9.39E+03	9.46E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	22.672	1	1	2.15E-06	1.72E-07	0	1.7E-07	10	1.72E-08	1.29E-08	8.58E-09	4.29E-09	No
Pyrimidine antibiotic	Trimethoprim	Turnagain Arm	7.11E-01	9.39E+03	7.58E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	9.58E-07	7.67E-08	0	7.7E-08	0.8	9.58E-08	7.19E-08	4.79E-08	2.40E-08	No
Quinoline antibiotic	Ciprofloxacin	Turnagain Arm	3.72E-01	9.39E+03	3.96E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	5.01E-07	4.01E-08	0	4.0E-08	4	1.00E-08	7.52E-09	5.01E-09	2.51E-09	No
Quinoline antibiotic	Ofloxacin	Turnagain Arm	4.27E-01	9.39E+03	4.55E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	5.75E-07	4.60E-08	0	4.6E-08	2	2.30E-08	1.73E-08	1.15E-08	5.75E-09	No
Rubber Stabilizing compound	6PPD-Quinone	Turnagain Arm	5.30E-03	9.39E+03	5.65E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	781.6	1.253	1.072	5.53E-07	4.42E-08	0	4.4E-08	2	2.21E-08	1.66E-08	1.11E-08	5.53E-09	No
Sex hormone	17 beta-Estradiol	Turnagain Arm	5.52E-03	9.39E+03	5.88E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	822	1.253	1.072	6.06E-07	4.85E-08	0	4.8E-08	0.01	4.85E-06	3.63E-06	2.42E-06	1.21E-06	No
Sex hormone	Estrone	Turnagain Arm	3.31E-02	9.39E+03	3.53E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	215.88	1.034	1.007	7.87E-07	6.30E-08	0	6.3E-08	--	--	--	--	--	Uncertainty
Sex hormone	Progesterone	Turnagain Arm	5.66E-02	9.39E+03	6.03E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	664.4	1.202	1.054	4.82E-06	3.85E-07	0	3.9E-07	0.66	5.84E-07	4.38E-07	2.92E-07	1.46E-07	No
Sex hormone	Testosterone	Turnagain Arm	7.17E-02	9.39E+03	7.64E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	288.12	1.053	1.012	2.32E-06	1.85E-07	0	1.9E-07	1.72	1.08E-07	8.09E-08	5.39E-08	2.70E-08	No
SSRI Antidepressant	Fluoxetine	Turnagain Arm	5.20E-02	9.39E+03	5.54E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	616	1.161	1.042	3.96E-06	3.17E-07	0	3.2E-07	1.136	2.79E-07	2.09E-07	1.40E-07	6.98E-08	No
SSRI Antidepressant	Norfluoxetine	Turnagain Arm	2.73E-02	9.39E+03	2.91E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1068	1.38	1.13	4.29E-06	3.43E-07	0	3.4E-07	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Paroxetine	Turnagain Arm	1.88E-02	9.39E+03	2.00E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	754.4	1.253	1.072	1.89E-06	1.51E-07	0	1.5E-07	--	--	--	--	--	Uncertainty
SSRI Antidepressant	Sertraline	Turnagain Arm	1.08E-01	9.39E+03	1.15E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	5716	4.803	4.742	3.16E-04	2.53E-05	0	2.5E-05	--	--	--	--	--	Uncertainty
Statin	Atorvastatin	Turnagain Arm	2.20E-01	9.39E+03	2.34E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	224.92	13.228	23.281	6.97E-05	5.58E-06	0	5.6E-06	20	2.79E-07	2.09E-07	1.39E-07	6.97E-08	No
Steroid	Methylprednisolone	Turnagain Arm	1.13E-01	9.39E+03	1.20E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	29.396	1	1	3.54E-07	2.83E-08	0	2.8E-08	8	3.54E-09	2.65E-09	1.77E-09	8.85E-10	No
Steroid	Prednisolone	Turnagain Arm	9.31E-03	9.39E+03	9.92E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	21.772	1	1	2.16E-08	1.73E-09	0	1.7E-09	6.72	2.57E-10	1.93E-10	1.29E-10	6.43E-11	No
Steroidal Estrogen	Equilenin	Turnagain Arm	1.34E-02	9.39E+03	1.43E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	726.4	1.202	1.054	1.25E-06	9.97E-08	0	1.0E-07	--	--	--	--	--	Uncertainty
Stimulant	Amphetamine	Turnagain Arm	5.39E-01	9.39E+03	5.74E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	26.936	1	1	1.55E-06	1.24E-07	0	1.2E-07	0.12	1.03E-06	7.73E-07	5.16E-07	2.58E-07	No
Stimulant	Caffeine	Turnagain Arm	1.05E+02	9.39E+03	1.12E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.42E-04	1.13E-05	0	1.1E-05	0.508	2.23E-05	1.67E-05	1.11E-05	5.57E-06	No
Stimulant	Cocaine	Turnagain Arm	7.68E-01	9.39E+03	8.18E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	61.16	1.01	1.002	5.05E-06	4.04E-07	0	4.0E-07	0.396	1.02E-06	7.66E-07	5.11E-07	2.55E-07	No
Streoid	Prednisone	Turnagain Arm	4.04E-01	9.39E+03	4.30E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	17.076	1	1	7.35E-07	5.88E-08	0	5.9E-08	--	--	--	--	--	Uncertainty
Sulfonamide antibiotic	Sulfadiazine	Turnagain Arm	1.46E-03	9.39E+03	1.56E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.97E-09	1.57E-10	0	1.6E-10	6	2.62E-11	1.97E-11	1.31E-11	6.56E-12	No
Sulfonamide antibiotic	Sulfamethizole	Turnagain Arm	5.11E-03	9.39E+03	5.44E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	6.89E-09	5.51E-10	0	5.5E-10	14	3.94E-11	2.95E-11	1.97E-11	9.84E-12	No
Sulfonamide antibiotic	Sulfamethoxazole	Turnagain Arm	1.08E+00	9.39E+03	1.15E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.46E-06	1.16E-07	0	1.2E-07	9.2	1.27E-08	9.49E-09	6.33E-09	3.16E-09	No
Sulfonamide antibiotic	Sulfanilamide	Turnagain Arm	3.48E-02	9.39E+03	3.71E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	4.69E-08	3.75E-09	0	3.8E-09	12	3.13E-10	2.34E-10	1.56E-10	7.82E-11	No
SVOCs/PAHs	1,2-Diphenylhydrazine	Turnagain Arm	2.50E+00	9.39E+03	2.66E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	161.76	1.028	1.007	4.43E-05	3.54E-06	0	3.5E-06	--	--	--	--	--	Uncertainty

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4									
SVOCs/PAHs	1,6,7-Trimethylnaphthalene	Turnagain Arm	1.00E-01	9.39E+03	1.07E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2775.2	2.452	1.871	7.25E-05	5.80E-06	0	5.8E-06	65.6	8.84E-08	6.63E-08	4.42E-08	2.21E-08	No
SVOCs/PAHs	1-Methyldibenzothiophene	Turnagain Arm	5.00E-02	9.39E+03	5.33E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2390	2.175	1.633	2.77E-05	2.22E-06	0	2.2E-06	65.6	3.38E-08	2.53E-08	1.69E-08	8.44E-09	No
SVOCs/PAHs	1-Methylfluorene	Turnagain Arm	5.00E-02	9.39E+03	5.33E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3534	3.181	2.612	5.99E-05	4.79E-06	0	4.8E-06	65.6	7.30E-08	5.48E-08	3.65E-08	1.83E-08	No
SVOCs/PAHs	1-Methylnaphthalene	Turnagain Arm	4.27E-01	9.39E+03	4.55E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	664.4	1.202	1.054	3.63E-05	2.91E-06	0	2.9E-06	0.94	3.09E-06	2.32E-06	1.55E-06	7.73E-07	No
SVOCs/PAHs	1-Methylphenanthrene	Turnagain Arm	2.85E-02	9.39E+03	3.04E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	19132	3.643	3.162	2.12E-04	1.69E-05	0	1.7E-05	65.6	2.58E-07	1.94E-07	1.29E-07	6.45E-08	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Turnagain Arm	1.20E+00	9.39E+03	1.28E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	505.6	1.128	1.033	7.29E-05	5.83E-06	0	5.8E-06	3	1.94E-06	1.46E-06	9.72E-07	4.86E-07	No
SVOCs/PAHs	2,6-Dimethylnaphthalene	Turnagain Arm	3.44E-01	9.39E+03	3.67E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1296.4	1.491	1.178	7.09E-05	5.67E-06	0	5.7E-06	65.6	8.64E-08	6.48E-08	4.32E-08	2.16E-08	No
SVOCs/PAHs	2-Methylanthracene	Turnagain Arm	6.36E-02	9.39E+03	6.78E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3698.8	3.181	2.612	7.97E-05	6.38E-06	0	6.4E-06	65.6	9.72E-08	7.29E-08	4.86E-08	2.43E-08	No
SVOCs/PAHs	2-Methylfluoranthene	Turnagain Arm	1.74E-02	9.39E+03	1.85E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	7672	6.266	7.079	8.91E-05	7.13E-06	0	7.1E-06	65.6	1.09E-07	8.15E-08	5.43E-08	2.72E-08	No
SVOCs/PAHs	2-Methylnaphthalene	Turnagain Arm	5.41E-01	9.39E+03	5.76E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	654.4	1.202	1.054	4.53E-05	3.63E-06	0	3.6E-06	65.6	5.53E-08	4.15E-08	2.76E-08	1.38E-08	No
SVOCs/PAHs	2-Methylphenanthrene	Turnagain Arm	6.47E-02	9.39E+03	6.89E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	13696	2.78	2.193	2.62E-04	2.10E-05	0	2.1E-05	65.6	3.20E-07	2.40E-07	1.60E-07	8.00E-08	No
SVOCs/PAHs	3,6-Dimethylphenanthrene	Turnagain Arm	1.89E-02	9.39E+03	2.01E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	33036	5.502	5.821	3.66E-04	2.93E-05	0	2.9E-05	65.6	4.46E-07	3.35E-07	2.23E-07	1.12E-07	No
SVOCs/PAHs	3-Methylphenanthrene	Turnagain Arm	5.79E-02	9.39E+03	6.17E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	13696	2.78	2.193	2.35E-04	1.88E-05	0	1.9E-05	65.6	2.86E-07	2.15E-07	1.43E-07	7.16E-08	No
SVOCs/PAHs	4-Methyldibenzothiophene	Turnagain Arm	2.29E-02	9.39E+03	2.44E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2390	2.175	1.633	1.27E-05	1.01E-06	0	1.0E-06	65.6	1.55E-08	1.16E-08	7.73E-09	3.87E-09	No
SVOCs/PAHs	Acenaphthene	Turnagain Arm	8.21E-02	9.39E+03	8.75E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	716.8	1.202	1.054	7.54E-06	6.03E-07	0	6.0E-07	65.6	9.19E-09	6.89E-09	4.60E-09	2.30E-09	No
SVOCs/PAHs	Acenaphthylene	Turnagain Arm	1.25E-02	9.39E+03	1.33E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	739.2	1.202	1.054	1.18E-06	9.47E-08	0	9.5E-08	65.6	1.44E-09	1.08E-09	7.22E-10	3.61E-10	No
SVOCs/PAHs	Anthracene	Turnagain Arm	5.53E-02	9.39E+03	5.89E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1604	1.766	1.334	1.67E-05	1.34E-06	0	1.3E-06	65.6	2.04E-08	1.53E-08	1.02E-08	5.09E-09	No
SVOCs/PAHs	Benz(a)anthracene	Turnagain Arm	2.50E-01	9.39E+03	2.66E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	11736	8.841	12.05	2.76E-03	2.21E-04	0	2.2E-04	0.62	3.57E-04	2.67E-04	1.78E-04	8.92E-05	No
SVOCs/PAHs	Benzo(a)fluoranthene	Turnagain Arm	1.51E-02	9.39E+03	1.61E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12096	8.841	12.05	1.72E-04	1.38E-05	0	1.4E-05	0.615	2.24E-05	1.68E-05	1.12E-05	5.60E-06	No
SVOCs/PAHs	Benzo(a)pyrene	Turnagain Arm	5.63E-02	9.39E+03	6.00E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	20588	11.337	17.783	1.40E-03	1.12E-04	0	1.1E-04	0.62	1.81E-04	1.36E-04	9.03E-05	4.52E-05	No
SVOCs/PAHs	Benzo(b)fluoranthene	Turnagain Arm	4.90E-02	9.39E+03	5.22E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12096	8.841	12.05	5.58E-04	4.47E-05	0	4.5E-05	0.62	7.20E-05	5.40E-05	3.60E-05	1.80E-05	No
SVOCs/PAHs	Benzo(b)fluorene	Turnagain Arm	4.06E-02	9.39E+03	4.33E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	11916	8.841	12.05	4.56E-04	3.65E-05	0	3.6E-05	0.615	5.93E-05	4.45E-05	2.96E-05	1.48E-05	No
SVOCs/PAHs	Benzo(e)pyrene	Turnagain Arm	5.23E-02	9.39E+03	5.57E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	32976	13.228	23.281	2.43E-03	1.94E-04	0	1.9E-04	0.615	3.16E-04	2.37E-04	1.58E-04	7.91E-05	No
SVOCs/PAHs	Benzo(g,h,i)perylene	Turnagain Arm	8.33E-02	9.39E+03	8.88E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	44000	13.98	25.645	5.46E-03	4.37E-04	0	4.4E-04	14.4	3.03E-05	2.27E-05	1.52E-05	7.58E-06	No
SVOCs/PAHs	Benzo(k,j)fluoranthene	Turnagain Arm	3.34E-02	9.39E+03	3.56E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	19972	11.337	17.783	8.06E-04	6.45E-05	0	6.4E-05	0.615	1.05E-04	7.86E-05	5.24E-05	2.62E-05	No
SVOCs/PAHs	Benzothiophene	Turnagain Arm	1.44E-02	9.39E+03	1.53E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	212.64	1.034	1.007	3.37E-07	2.70E-08	0	2.7E-08	0.615	4.39E-08	3.29E-08	2.19E-08	1.10E-08	No
SVOCs/PAHs	Biphenyl	Turnagain Arm	1.02E-01	9.39E+03	1.09E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	822	1.253	1.072	1.12E-05	8.96E-07	0	9.0E-07	0.615	1.46E-06	1.09E-06	7.28E-07	3.64E-07	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Turnagain Arm	9.50E+01	9.39E+03	1.01E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	6848	11.708	16.749	8.12E-01	6.49E-02	0	6.5E-02	18.3	3.55E-03	2.66E-03	1.77E-03	8.87E-04	No
SVOCs/PAHs	Butyl Benzyl Phthalate	Turnagain Arm	5.62E+00	9.39E+03	5.99E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	2454.4	2.175	1.633	3.20E-03	2.56E-04	0	2.6E-04	159	1.61E-06	1.21E-06	8.04E-07	4.02E-07	No
SVOCs/PAHs	Carbazole	Turnagain Arm	2.01E-01	9.39E+03	2.14E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	529.2	1.128	1.033	1.28E-05	1.02E-06	0	1.0E-06	0.615	1.66E-06	1.25E-06	8.32E-07	4.16E-07	No
SVOCs/PAHs	Chrysene/Triphenylene	Turnagain Arm	6.14E-02	9.39E+03	6.54E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12660	8.841	12.05	7.32E-04	5.86E-05	0	5.9E-05	0.615	9.53E-05	7.14E-05	4.76E-05	2.38E-05	No
SVOCs/PAHs	cis/trans Decalin	Turnagain Arm	4.84E-01	9.39E+03	5.16E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1091.2	1.38	1.13	7.77E-05	6.21E-06	0	6.2E-06	16.68	3.72E-07	2.79E-07	1.86E-07	9.31E-08	No
SVOCs/PAHs	Dibenzo(a,h)anthracene	Turnagain Arm	6.68E-03	9.39E+03	7.12E-07	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	38384	13.662	24.604	3.73E-04	2.99E-05	0	3.0E-05	2.66	1.12E-05	8.42E-06	5.61E-06	2.81E-06	No
SVOCs/PAHs	Dibenzofuran	Turnagain Arm	6.98E-02	9.39E+03	7.44E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	971.6	1.315	1.096	9.50E-06	7.60E-07	0	7.6E-07	0.615	1.24E-06	9.27E-07	6.18E-07	3.09E-07	No
SVOCs/PAHs	Dibenzothiophene	Turnagain Arm	3.35E-02	9.39E+03	3.57E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1442	1.614	1.242	8.31E-06	6.65E-07	0	6.6E-07	1.04	6.39E-07	4.79E-07	3.20E-07	1.60E-07	No
SVOCs/PAHs	Diethyl Phthalate	Turnagain Arm	3.70E+00	9.39E+03	3.94E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	73.4	1.01	1.002	2.92E-05	2.34E-06	0	2.3E-06	4600	5.08E-10	3.81E-10	2.54E-10	1.27E-10	No
SVOCs/PAHs	Dimethyl Phthalate	Turnagain Arm	1.20E-01	9.39E+03	1.28E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	21.124	1	1	2.70E-07	2.16E-08	0	2.2E-08	68	3.18E-10	2.38E-10	1.59E-10	7.94E-11	No
SVOCs/PAHs	Di-n-butyl Phthalate	Turnagain Arm	8.40E-01	9.39E+03	8.95E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1730.4	1.766	1.334	2.74E-04	2.19E-05	0	2.2E-05	1340	1.63E-08	1.22E-08	8.16E-09	4.08E-09	No
SVOCs/PAHs	Di-n-octyl Phthalate	Turnagain Arm	1.89E+01	9.39E+03	2.01E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3895.6	7.278	6.012	5.71E-02	4.57E-03	0	4.6E-03	36.8	1.24E-04	9.31E-05	6.21E-05	3.10E-05	No
SVOCs/PAHs	Fluoranthene	Turnagain Arm	3.17E-01	9.39E+03	3.38E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	4716	4.188	3.873	6.67E-04	5.34E-05	0	5.3E-05	125	4.27E-07	3.20E-07	2.13E-07	1.07E-07	No
SVOCs/PAHs	Fluorene	Turnagain Arm	1.26E-01	9.39E+03	1.34E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	1064.4	1.38	1.13	1.97E-05	1.58E-06	0	1.6E-06	125	1.26E-08	9.47E-09	6.31E-09	3.16E-09	No
SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	Turnagain Arm	4.44E-02	9.39E+03	4.73E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	48720	14.223	26.363	3.28E-03	2.62E-04	0	2.6E-04	7.2	3.64E-05	2.73E-05	1.82E-05	9.11E-06	No
SVOCs/PAHs	Isophorone	Turnagain Arm	3.80E-01	9.39E+03	4.05E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	24.588	1	1	9.96E-07	7.96E-08	0	8.0E-08	150	5.31E-10	3.98E-10	2.65E-10	1.33E-10	No
SVOCs/PAHs	Naphthalene	Turnagain Arm	9.80E-01	9.39E+03	1.04E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	279.52	1.053	1.012	3.07E-05	2.46E-06	0	2.5E-06	71	3.46E-08	2.60E-08	1.73E-08	8.66E-09	No
SVOCs/PAHs	Naphthobenzothiophene	Turnagain Arm	3.37E-02	9.39E+03	3.59E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	4936	4.188	3.873	7.42E-05	5.94E-06	0	5.9E-06	0.615	9.66E-06	7.24E-06	4.83E-06	2.41E-06	No
SVOCs/PAHs	N-Nitrosodimethylamine	Turnagain Arm	9.60E+00	9.39E+03	1.02E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.29E-05	1.04E-06	0	1.0E-06	0.005	2.07E-04	1.55E-04	1.04E-04	5.18E-05	No
SVOCs/PAHs	Pentachlorophenol (PCP)	Turnagain Arm	6.30E+00	9.39E+03	6.71E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	4440	3.643	3.162	1.09E-02	8.69E-04	0	8.7E-04	8.42	1.03E-04	7.74E-05	5.16E-05	2.58E-05	No
SVOCs/PAHs	Perylene	Turnagain Arm	3.33E-02	9.39E+03	3.55E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	24708	12.691	21.677	1.11E-03	8.90E-05	0	8.9E-05	0.615	1.45E-04	1.09E-04	7.24E-05	3.62E-05	No
SVOCs/PAHs	Phenanthrene	Turnagain Arm	9.80E-01	9.39E+03	1.04E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	7460	1.766	1.334	1.38E-03	1.10E-04	0	1.1E-04	65.6	1.68E-06	1.26E-06	8.39E-07	4.19E-07	No
SVOCs/PAHs	Phenol	Turnagain Arm	5.45E+01	9.39E+03	5.81E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	17.076	1	1	9.92E-05	7.93E-06	0	7.9E-06	60	1.32E-07	9.92E-08	6.61E-08	3.31E-08	No
SVOCs/PAHs	Pyrene	Turnagain Arm	4.70E-01	9.39E+03	5.01E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	3082.4	2.78	2.193	4.29E-04	3.43E-05	0	3.4E-05	0.615	5.58E-05	4.19E-05	2.79E-05	1.40E-05	No
SVOCs/PAHs	Retene	Turnagain Arm	1.08E-02	9.39E+03	1.15E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	131400	12.691	21.677	1.92E-03	1.54E-04	0	1.5E-04	65.6	2.34E-06	1.76E-06	1.17E-06	5.85E-07	No
Tetracycline antibiotic	Doxycycline	Turnagain Arm	1.50E-01	9.39E+03	1.60E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.02E-07	1.62E-08	0	1.6E-08	4.0298	4.01E-09	3.01E-09	2.01E-09	1.00E-09	No
Tetracycline antibiotic	Tetracycline [TC]	Turnagain Arm	9.79E-02	9.39E+03	1.04E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.32E-07	1.06E-08	0	1.1E-08	6.4	1.65E-09	1.24E-09	8.25E-10	4.12E-10	No
Tranquilizer	Meprobamate	Turnagain Arm	3.83E-01	9.39E+03	4.08E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	5.16E-07	4.13E-08	0	4.1E-08	3	1.38E-08	1.03E-08	6.88E-09	3.44E-09	No
Urinary steroid	Androsterone	Turnagain Arm	5.71E-02	9.39E+03	6.08E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	505.6	1.128	1.033	3.47E-06	2.78E-07	0	2.8E-07	200	1.39E-09	1.04E-09	6.94E-10	3.47E-10	No
VOCs	1,1,1-Trichloroethane (TCA)	Turnagain Arm	7.90E-01	9.39E+03	8.42E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	81.64	1.01	1.002	6.94E-06	5.55E-07	0	5.6E-07	999	5.56E-10	4.17E-10	2.78E-10	1.39E-10	No
VOCs	1,2-Dichloroethane (EDC)	Turnagain Arm	8.00E-02	9.39E+03	8.52E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	17.604	1	1	1.50E-07	1.20E-08	0	1.2E-08	382	3.14E-11	2.36E-11	1.57E-11	7.86E-12	No
VOCs	1,4-Dichlorobenzene	Turnagain Arm	8.40E-01	9.39E+03	8.95E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	345.76	1.067	1.014	3.30E-05	2.64E-06	0	2.6E-06	2.5	1.06E-06	7.92E-07	5.28E-07	2.64E-07	No
VOCs	2-Butanone (MEK)	Turnagain Arm	6.80E+01	9.39E+03	7.25E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	9.16E-05	7.33E-06	0	7.3E-06	1771	4.14E-09	3.10E-09	2.07E-09	1.03E-09	No
VOCs	2-Hexanone	Turnagain Arm	5.70E+00	9.39E+03	6.07E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	15.12	1	1	9.18E-06	7.35E-07	0	7.3E-07	8.27	8.88E-08	6.66E-08	4.44E-08	2.22E-08	No
VOCs	Acetone	Turnagain Arm	3.00E+02	9.39E+03	3.20E-02	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	4.04E-04	3.23E-05	0	3.2E-05	20	1.62E-06	1.21E-06	8.09E-07	4.04E-07	No
VOCs	Acrolein	Turnagain Arm	1.30E+00	9.39E+03	1.39E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	1.75E-06	1.40E-07	0	1.4E-07	0.05	2.80E-06	2.10E-06	1.40E-06	7.01E-07	No
VOCs	Benzene	Turnagain Arm	7.80E-01	9.39E+03	8.31E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	47.24	1.005	1	3.95E-06	3.16E-07	0	3.2E-07	26.36	1.20E-08	8.98E-09	5.99E-09	2.99E-09	No
VOCs	Bromodichloromethane	Turnagain Arm	8.00E-02	9.39E+03	8.52E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	38.784	1.005	1	3.32E-07	2.66E-08	0	2.7E-08	3.58	7.42E-09	5.57E-09	3.71E-09	1.86E-09	No
VOCs	Bromomethane	Turnagain Arm	9.00E-02	9.39E+03	9.59E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	11.328	1	1	1.09E-07	8.69E-09	0	8.7E-09	0.284	3.06E-08	2.30E-08	1.53E-08	7.65E-09	No
VOCs	Carbon Disulfide	Turnagain Arm	7.00E-01	9.39E+03	7.46E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	35.404	1	1	2.64E-06	2.11E-07	0	2.1E-07	11	1.92E-08	1.44E-08	9.60E-09	4.80E-09	No
VOCs	Chlorobenzene	Turnagain Arm	8.00E-02	9.39E+03	8.52E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	138.96	1.028	1.007	1.22E-06	9.74E-08	0	9.7E-08	19	5.13E-09	3.85E-09	2.56E-09	1.28E-09	No
VOCs	Chloroethane	Turnagain Arm	6.90E-01	9.39E+03	7.35E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	16.316	1	1	1.20E-06	9.60E-08	0	9.6E-08	--	--	--	--	--	Uncertainty
VOCs	Chloroform	Turnagain Arm	3.95E+00	9.39E+03	4.21E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	37.056	1	1	1.56E-05	1.25E-06	0	1.2E-06	2.58	4.84E-07	3.63E-07	2.42E-07	1.21E-07	No
VOCs	Chloromethane	Turnagain Arm	1.90E+00	9.39E+03	2.02E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.648	1	1	2.56E-06	2.05E-07	0	2.0E-07	3.2	6.40E-08	4.80E-08	3.20E-08	1.60E-08	No
VOCs	cis-1,2-Dichloroethene	Turnagain Arm	7.00E-02	9.39E+03	7.46E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	38.784	1.005	1	2.91E-07	2.33E-08	0	2.3E-08	90.4	2.57E-10	1.93E-10	1.29E-10	6.43E-11	No
VOCs	Dichloromethane (Methylene Chlori	Turnagain Arm	6.85E+00	9.39E+03	7.30E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	12.412	1	1	9.06E-06	7.25E-07	0	7.2E-07	5.85	1.24E-07	9.29E-08	6.19E-08	3.10E-08	No
VOCs	Ethylbenzene	Turnagain Arm	1.50E+00	9.39E+03	1.60E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	222.56	1.042	1.009	3.71E-05	2.97E-06	0	3.0E-06	97.1	3.05E-08	2.29E-08	1.53E-08	7.63E-09	No
VOCs	m,p-Xylenes	Turnagain Arm	6.20E+00	9.39E+03	6.61E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	226	1.042	1.009	1.56E-04	1.24E-05	0	1.2E-05	2.1	5.93E-06	4.44E-06	2.96E-06	1.48E-06	No
VOCs	o-Xylene	Turnagain Arm	2.60E+00	9.39E+03	2.77E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	225.96	1.042	1.009	6.52E-05	5.22E-06	0	5.2E-06	2.1	2.48E-06	1.86E-06	1.24E-06	6.21E-07	No
VOCs	Styrene	Turnagain Arm	5.50E+00	9.39E+03	5.86E-04	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	164.24	1.028	1.007	9.89E-05	7.92E-06	0	7.9E-06	200	3.96E-08	2.97E-08	1.98E-08	9.89E-09	No
VOCs	Tetrachloroethene (PCE)	Turnagain Arm	6.00E-01	9.39E+03	6.39E-05	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	325.36	1.067	1.014	2.22E-05	1.78E-06	0	1.8E-06	63	2.82E-08	2.11E-08	1.41E-08	7.05E-09	No
VOCs	Toluene	Turnagain Arm	1.60E+01	9.39E+03	1.70E-03	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	117.56	1.01	1.002	2.02E-04	1.62E-05	0	1.6E-05	26	6.23E-07	4.67E-07	3.11E-07	1.56E-07	No
VOCs	Trichloroethene (TCE)	Turnagain Arm	7.00E-02	9.39E+03	7.46E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	73.4	1.01

Table C-19. Tier 2 Risk Estimation - Marine Mammals

AWWU Ecological Risk Evaluation

Analyte Group	Analyte	Exposure Area	Exposure Point Concentration			Exposure Parameters					Fish Consumption									Surface Water Dose (L/kg/d)	Total Daily Dose (mg/kg/d)	No Effect TRV (mg/kg/d)	Risk Estimates by Exposure Duration				
			Effluent RME Concentration (ug/L)	Dilution Factor	Modeled RME EPC (ug/L)	Receptor	Body Weight (kg)	Food Intake (kg/kg/d)	Water Intake (L/kg/d)	AUF	Diet Proportion	Diet Components		RME EPC Fish Tissue (mg/kg)	BCF (L/kg)	FCM		Fish (mg/kg)	Fish Dose (mg/kg/d)				12 Month Exposure HQ	9 Month Exposure HQ	6 Month Exposure HQ	3 Month Exposure HQ	Refined Assessment - Potential For Risk
												Trophic Level 3	Trophic Level 4			Trophic Level 3	Trophic Level 4										
VOCs	Vinyl Chloride	Turnagain Arm	2.00E-02	9.39E+03	2.13E-06	Steller Sea Lion	263	0.08	0	1.0000	1	1	0	model	21.884	1	1	4.66E-08	3.73E-09	0	3.7E-09	0.17	2.19E-08	1.65E-08	1.10E-08	5.49E-09	No
Beluga - Measured Fish Tissue Model																											
Metals	Antimony	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.00791	--	--	--	7.91E-03	2.37E-04	--	2.4E-04	0.059	4.02E-03	3.02E-03	2.01E-03	1.01E-03	No
Metals	Arsenic	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	4.546	--	--	--	4.55E+00	1.36E-01	--	1.4E-01	1.04	1.31E-01	9.84E-02	6.56E-02	3.28E-02	No
Metals	Beryllium	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0028	--	--	--	2.80E-03	8.40E-05	--	8.4E-05	0.532	1.58E-04	1.18E-04	7.89E-05	3.95E-05	No
Metals	Cadmium	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.162	--	--	--	1.62E-01	4.86E-03	--	4.9E-03	0.77	6.31E-03	4.73E-03	3.16E-03	1.58E-03	No
Metals	Chromium	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.422	--	--	--	4.22E-01	1.27E-02	--	1.3E-02	2.4	5.28E-03	3.96E-03	2.64E-03	1.32E-03	No
Metals	Copper	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	4.496	--	--	--	4.50E+00	1.35E-01	--	1.3E-01	5.6	2.41E-02	1.81E-02	1.20E-02	6.02E-03	No
Metals	Lead	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0318	--	--	--	3.18E-02	9.54E-04	--	9.5E-04	4.7	2.03E-04	1.52E-04	1.01E-04	5.07E-05	No
Metals	Mercury	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0317	--	--	--	3.17E-02	9.51E-04	--	9.5E-04	1.41	6.74E-04	5.06E-04	3.37E-04	1.69E-04	No
Metals	Methyl Mercury	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0278	--	--	--	2.78E-02	8.34E-04	--	8.3E-04	0.032	2.61E-02	1.95E-02	1.30E-02	6.52E-03	No
Metals	Molybdenum	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0244	--	--	--	2.44E-02	7.32E-04	--	7.3E-04	0.52	1.41E-03	1.06E-03	7.04E-04	3.52E-04	No
Metals	Nickel	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.273	--	--	--	2.73E-01	8.19E-03	--	8.2E-03	1.7	4.82E-03	3.61E-03	2.41E-03	1.20E-03	No
Metals	Selenium	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.757	--	--	--	7.57E-01	2.27E-02	--	2.3E-02	0.143	1.59E-01	1.19E-01	7.94E-02	3.97E-02	No
Metals	Silver	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0734	--	--	--	7.34E-02	2.20E-03	--	2.2E-03	6.02	3.66E-04	2.74E-04	1.83E-04	9.14E-05	No
Metals	Thallium	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0037	--	--	--	3.70E-03	1.11E-04	--	1.1E-04	0.096	1.16E-03	8.67E-04	5.78E-04	2.89E-04	No
Metals	Zinc	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	31.55	--	--	--	3.16E+01	9.47E-01	--	9.5E-01	75.4	1.26E-02	9.41E-03	6.28E-03	3.14E-03	No
PCBs	Aroclor 1254	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.00317	--	--	--	3.17E-03	9.51E-05	--	9.5E-05	0.137	6.94E-04	5.21E-04	3.47E-04	1.74E-04	No
PCBs	Aroclor 1260	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.00291	--	--	--	2.91E-03	8.73E-05	--	8.7E-05	0.137	6.37E-04	4.78E-04	3.19E-04	1.59E-04	No
Pesticides	Chlordane, alpha (cis)	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.006	--	--	--	6.00E-03	1.80E-04	--	1.8E-04	0.15	1.20E-03	9.00E-04	6.00E-04	3.00E-04	No
Pesticides	Mirex	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.002	--	--	--	2.00E-03	6.00E-05	--	6.0E-05	0.07	8.57E-04	6.43E-04	4.29E-04	2.14E-04	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.029	--	--	--	2.90E-02	8.70E-04	--	8.7E-04	3	2.90E-04	2.18E-04	1.45E-04	7.25E-05	No
SVOCs/PAHs	2-Nitrophenol	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.098	--	--	--	9.80E-02	2.94E-03	--	2.9E-03	400	7.35E-06	5.51E-06	3.68E-06	1.84E-06	No
SVOCs/PAHs	4-Nitrophenol	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0748	--	--	--	7.48E-02	2.24E-03	--	2.2E-03	400	5.61E-06	4.21E-06	2.81E-06	1.40E-06	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.875	--	--	--	8.75E-01	2.63E-02	--	2.6E-02	18.3	1.43E-03	1.08E-03	7.17E-04	3.59E-04	No
SVOCs/PAHs	Di-n-octyl Phthalate	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.164	--	--	--	1.64E-01	4.92E-03	--	4.9E-03	36.8	1.34E-04	1.00E-04	6.68E-05	3.34E-05	No
SVOCs/PAHs	Nitrobenzene	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0322	--	--	--	3.22E-02	9.66E-04	--	9.7E-04	5.9	1.64E-04	1.23E-04	8.19E-05	4.09E-05	No
SVOCs/PAHs	N-Nitrosodimethylamine	Cook Inlet, Fish Tissue	--	--	--	Beluga Whale	1428	0.03	0	1	1	1	0	0.0976	--	--	--	9.76E-02	2.93E-03	--	2.9E-03	0.005	5.86E-01	4.39E-01	2.93E-01	1.46E-01	No
Steller Sea Lion -Measured Fish Model																											
Metals	Antimony	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.00791	--	--	--	7.91E-03	6.33E-04	--	6.3E-04	0.059	1.07E-02	8.04E-03	5.36E-03	2.68E-03	No
Metals	Arsenic	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	4.546	--	--	--	4.55E+00	3.64E-01	--	3.6E-01	1.04	3.50E-01	2.62E-01	1.75E-01	8.74E-02	No
Metals	Beryllium	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0028	--	--	--	2.80E-03	2.24E-04	--	2.2E-04	0.532	4.21E-04	3.16E-04	2.11E-04	1.05E-04	No
Metals	Cadmium	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.162	--	--	--	1.62E-01	1.30E-02	--	1.3E-02	0.77	1.68E-02	1.26E-02	8.42E-03	4.21E-03	No
Metals	Chromium	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.422	--	--	--	4.22E-01	3.38E-02	--	3.4E-02	2.4	1.41E-02	1.06E-02	7.03E-03	3.52E-03	No
Metals	Copper	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	4.496	--	--	--	4.50E+00	3.60E-01	--	3.6E-01	5.6	6.42E-02	4.82E-02	3.21E-02	1.61E-02	No
Metals	Lead	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0318	--	--	--	3.18E-02	2.54E-03	--	2.5E-03	4.7	5.41E-04	4.06E-04	2.71E-04	1.35E-04	No
Metals	Mercury	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0317	--	--	--	3.17E-02	2.54E-03	--	2.5E-03	1.41	1.80E-03	1.35E-03	8.99E-04	4.50E-04	No
Metals	Methyl Mercury	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0278	--	--	--	2.78E-02	2.22E-03	--	2.2E-03	0.032	6.95E-02	5.21E-02	3.48E-02	1.74E-02	No
Metals	Molybdenum	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0244	--	--	--	2.44E-02	1.95E-03	--	2.0E-03	0.52	3.75E-03	2.82E-03	1.88E-03	9.38E-04	No
Metals	Nickel	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.273	--	--	--	2.73E-01	2.18E-02	--	2.2E-02	1.7	1.28E-02	9.64E-03	6.42E-03	3.21E-03	No
Metals	Selenium	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.757	--	--	--	7.57E-01	6.06E-02	--	6.1E-02	0.143	4.23E-01	3.18E-01	2.12E-01	1.06E-01	No
Metals	Silver	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0734	--	--	--	7.34E-02	5.87E-03	--	5.9E-03	6.02	9.75E-04	7.32E-04	4.88E-04	2.44E-04	No
Metals	Thallium	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0037	--	--	--	3.70E-03	2.96E-04	--	3.0E-04	0.096	3.08E-03	2.31E-03	1.54E-03	7.71E-04	No
Metals	Zinc	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	31.55	--	--	--	3.16E+01	2.52E+00	--	2.5E+00	75.4	3.35E-02	2.51E-02	1.67E-02	8.37E-03	No
PCBs	Aroclor 1254	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.00317	--	--	--	3.17E-03	2.54E-04	--	2.5E-04	0.137	1.85E-03	1.39E-03	9.26E-04	4.63E-04	No
PCBs	Aroclor 1260	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.00291	--	--	--	2.91E-03	2.33E-04	--	2.3E-04	0.137	1.70E-03	1.27E-03	8.50E-04	4.25E-04	No
Pesticides	Chlordane, alpha (cis)	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.006	--	--	--	6.00E-03	4.80E-04	--	4.8E-04	0.15	3.20E-03	2.40E-03	1.60E-03	8.00E-04	No
Pesticides	Mirex	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.002	--	--	--	2.00E-03	1.60E-04	--	1.6E-04	0.07	2.29E-03	1.71E-03	1.14E-03	5.71E-04	No
SVOCs/PAHs	2,4,6-Trichlorophenol	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.029	--	--	--	2.90E-02	2.32E-03	--	2.3E-03	3	7.73E-04	5.80E-04	3.87E-04	1.93E-04	No
SVOCs/PAHs	2-Nitrophenol	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.098	--	--	--	9.80E-02	7.84E-03	--	7.8E-03	400	1.96E-05	1.47E-05	9.80E-06	4.90E-06	No
SVOCs/PAHs	4-Nitrophenol	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0748	--	--	--	7.48E-02	5.98E-03	--	6.0E-03	400	1.50E-05	1.12E-05	7.48E-06	3.74E-06	No
SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.875	--	--	--	8.75E-01	7.00E-02	--	7.0E-02	18.3	3.83E-03	2.87E-03	1.91E-03	9.56E-04	No
SVOCs/PAHs	Di-n-octyl Phthalate	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.164	--	--	--	1.64E-01	1.31E-02	--	1.3E-02	36.8	3.57E-04	2.67E-04	1.78E-04	8.91E-05	No
SVOCs/PAHs	Nitrobenzene	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0322	--	--	--	3.22E-02	2.58E-03	--	2.6E-03	5.9	4.37E-04	3.27E-04	2.18E-04	1.09E-04	No
SVOCs/PAHs	N-Nitrosodimethylamine	Cook Inlet, Fish Tissue	--	--	--	Steller Sea Lion	263	0.08	0	1	1	1	0	0.0976	--	--	--	9.76E-02	7.81E-03	--	7.8E-03	0.005	1.56E+00	1.17E+00	7.81E-01	3.90E-01	**Yes**

Notes:

AUF = Area use factor

BCF = bioconcentration factor

FCM = food chain multiplier

HQ = hazard quotient

TRV = threshold residual value

kg = kilogram

kg/kgbw/d = kilogram per kilogram of bodyweight per day

L/kgbw/d = liters per kilogram of bodyweight per day

mg/kg = milograms per kilogram

L/kg = liters per kilogram

Table C-20. Tier 2 Risk Summary - Marine Mammals

AWWU Ecological Risk Evaluation

Location	Exposure Media	Analyte Group	Analyte	12 Month Exposure Duration		9 Month Exposure Duration		6 Month Exposure Duration		3 Month Exposure Duration		Retain for Risk Description
				No Effect HQ		No Effect HQ		No Effect HQ		No Effect HQ		
				Beluga Whale	Stellar Sea Lion	Beluga Whale	Stellar Sea Lion	Beluga Whale	Stellar Sea Lion	Beluga Whale	Stellar Sea Lion	
ZID (350meters)	Effluent	--	--	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	No Contaminants Retained
Knik Arm	Effluent	--	--	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	No Contaminants Retained
Mid-Upper Cook Inlet	Effluent	--	--	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	No Contaminants Retained
Turnagain Arm	Effluent	--	--	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	No Contaminants Retained
Cook Inlet	Fish Tissue	SVOCs/PAHs	N-Nitrosodimethylamine	<1	**1.6E+00**	<1	**1.2E+00**	<1	<1	<1	<1	**Yes**

Notes:

HQ - hazard quotient

Table C-21. Uncertainty Analysis

AWWU Ecological Risk Evaluation

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
Problem Formulation			
Fate and Transport	It is assumed that chemical concentrations in effluent will not change over time, and that concentrations are constant through the gradient of the mixing zone during the exposure duration. Natural attenuation, dilution, and/or other degradation processes may be significant in some areas resulting in an over-estimation of exposure.	Moderate	Over-estimation of exposure/risk
Data Collection/Analysis	Variability in analyses, laboratories, representativeness of samples, sampling errors, quantity, and homogeneity of the sample matrix can influence quality and quantity of data used in the risk assessment. Data were validated, but historical sampling programs may not have had the same standards as more recent ones.	Unknown	Over- or under-estimation of exposure/risk
Background Threshold Values	Background threshold values were not available for Upper Cook Inlet. Contribution from background was not quantified.	Medium	Over-estimation of exposure/risk
Endangered Species	Consideration of endangered species that have been observed or are expected to be found in the exposure areas are from opportunistic sightings during field investigations and best evidence from research. It is assumed the species may use areas within the exposure areas equally and in accordance with exposure scenario refinement. Based upon best available information, variable use distribution of exposure areas would be expected from the identified listed species. The action area and end of pipe locations on Point Woronzof are not typical high use areas for the identified listed species.	Moderate	Over-estimation of exposure/risk
Exposure Pathway Analysis	Incidental ingestion of seawtaer by marine mammals was considered minor and was not included in the exposure analysis. Although exposure via direct oral ingestions routes may contribute to the total risk to each species, potential risks may be underestimated because these routes were not quantified.	Low	Under-estimation of exposure/risk
Analysis			
Wildlife Exposure Factors	Life history data for prey fish and marine mammals specific to the site are complex. Exposure parameters (e.g., food ingestion rates) were either modeled or data from the same species in other portions of its range was used to make estimates.	Moderate	Over- or under-estimation of exposure/risk
Bioaccumulation Factors	Site-specific data on contaminant concentrations in wildlife foods were not available. Literature-based BCFs and FCMs were used to estimate bioaccumulation. Comparison of modeled vs. measured data for the same exposure area indicated that the modeled values were higher for some chemicals and lower for others vs. measured values.	Moderate	Over- or under-estimation of exposure/risk
Bioavailability	Bioavailability of contaminants was assumed to be 100 percent. This likely overestimates risk to receptors at the site.	Low	Over-estimation of exposure/risk
End of Pipe Exposure Area	Site use was assumed to be 100% for the End of Pipe exposure area for Tier 2 evaluation, the selected receptors could not feasibly forage and occupy the marginal habitate provided by the oppenings in the pipe itself. The end of pipe risk estimates are qualified.	High	Over-estimation of exposure/risk
Area Use Factors	Area use factors (AUFs) were only applied to Tier 2 risk estimates for marine mammals. Movement of prey fish is uncertain and application of an AUF would increase the level of uncertainty.	Moderate	Over- estimation of exposure/risk

Table C-21. Uncertainty Analysis

AWWU Ecological Risk Evaluation

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
Toxicity Benchmarks and Toxicity Reference Values	Ecological screening benchmarks (BMs) and toxicity reference values (TRVs) used in this evaluation were obtained from commonly accepted literature sources. Some values are based on a single species and some are a statistical value developed using results for several species. This is state of the practice for risk assessments in absence of site-specific toxicity testing. There is some uncertainty in using these values, however, they were selected using very conservative parameters (i.e., the most conservative value among the various sources was used). Estimated risk decisions should be evaluated concurrent with the WET testing results to confirm potentially toxic estimates.	Low	Over- or under-estimation of exposure/risk
Toxicity Benchmarks and Toxicity Reference Values	Toxicity data were not available for all contaminants. Contaminants for which toxicity data were unavailable were not evaluated, or surrogate toxicity data were used. Risks may be overestimated or underestimated. Determinations for these contaminants should be evaluated primarily with additional lines of evidence to determine if more contaminant specific information is required for meaningful risk recommendations. WET test results indicate low aggregate toxicity below permit limits overall. The sea urchin test is considered highly sensitive and protective of marine environments.	Moderate	Over- or under-estimation of exposure/risk
Toxicity Benchmarks and Toxicity Reference Values	There is limited confidence in some of the BMs and TRVs used in this evaluation because of the limited amount of toxicity data on which they are based.	Moderate	Over- or under-estimation of risks
Toxicity Reference Values	Uncertainty factors were used to estimate chronic NOAEL-equivalent BMs and TRVs from other endpoints.	Moderate	Over- or under-estimation of risks
Toxicity Reference Values	Sources of TRVs occasionally apply different uncertainty factors than those used in this report to adjust a study to a "Chronic NOAEL". When details of the study were available, the standardized uncertainty factors from this report were used. If sufficient details of the study were not presented or were not sufficiently complete to make a determination, then the interpretations made by the source document were used.	Low	Over- or under-estimation of risks
Toxicity Reference Values	Sources of TRVs occasionally apply different uncertainty factors than those used in this report to adjust a study to a "Chronic NOAEL". When details of the study were available, the standardized uncertainty factors from this report were used. If sufficient details of the study were not presented or were not sufficiently complete to make a determination, then the interpretations made by the source document were used.	Low	Over- or under-estimation of risks
Toxicity Reference Values	TRVs for oral toxicity were primarily derived from terrestrial mammals. Toxicity to marine mammals was assumed to be similar to model mammalian organisms often used for human health criteria.	Low	Over- or under-estimation of risks
Risk Characterization			
Risk Estimation	Potential ecological risks were quantified using the HQ approach. The magnitude of the HQ indicates potential for ecological risk, but is not an exact estimation of risk. For example, the actual risk from a chemical with an HQ of 70 could be less than that for a chemical with an HQ of 20 because of uncertainties involved in estimating exposure, selection of effects criteria (TRVs), or field conditions affecting exposure.	Moderate	Over- or under-estimation of risks

Table C-21. Uncertainty Analysis

AWWU Ecological Risk Evaluation

Assessment Element	Uncertainty	Magnitude of Impact	Direction of Impact
Risk Estimation	Data necessary to estimate potential risks from all pathways for all chemicals in the food-chain uptake model were not always available. For these chemicals and/or areas, the food-chain uptake model was completed using the available data.	Moderate	Under-estimation of exposure/risk
Risk Estimation	Potential exposure and risks were estimated assuming that adjacent areas are not impacted by unknown adjacent sources of contaminants. This may underestimate overall risks to those receptors not specific to AWWU that travel around Cook Inlet and are exposed to contaminants from many other sources. However, given the general low risks as estimated by the predominate number of contaminants with HQ<1 at the No Effect Level, it is unlikely that potential risks among source areas are underestimated to a significant degree.	Low	Under-estimation of exposure/risk
Risk Estimation	Incremental risk estimates were not completed for this evaluation. Incremental risk provides context to potential risks and whether or not risks are primarily due to ambient background concentrations or may be source-related.	Low	Over-estimation of exposure/risk

Notes:
AUF - area use factor
HQ - hazard quotient
NOAEL - no observed adverse effect level
LOAEL - lowest observed adverse effect level
TRV - toxicity reference value
UCL - upper confidence level

Table C-22. Ecological Risk Description
AWWU Ecological Risk Evaluation

Exposure Area	Exposure Media	Analyte Group	Analyte	12 Month Exposure Duration			9 Month Exposure Duration		6 Month Exposure Duration		3 Month Exposure Duration		Weight of Evidence Recommendations	
				No Effect HQ			No Effect HQ		No Effect HQ		No Effect HQ			
				Prey Fish	Beluga Whale	Stellar Sea Lion	Beluga Whale	Stellar Sea Lion	Beluga Whale	Stellar Sea Lion	Beluga Whale	Stellar Sea Lion	Potential for Risk to Prey or Listed Marine Mammals from Discharge?	Notes
ZID (350meters)	Effluent	--	--	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	No	No detected analytes indicated potential for risk to any receptor under conservative exposure and toxicity assumptions.
Knik Arm	Effluent	--	--	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1		
Mid-Upper Cook Inlet	Effluent	--	--	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1		
Turnagain Arm	Effluent	--	--	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1	All HQs < 1		
Cook Inlet	Fish Tissue	SVOCs/PAHs	N-Nitrosodimethylamine	--	<1	**2E+00**	<1	**1E+00**	<1	<1	<1	<1	No	Risk estimates for Stellar sea lion exceeded 1 at the NOAEL for 12-month exposure only. Refined HQ for 9-month exposure was equal to 1 at the No Effect level. More realistic exposures accounting for migration do not result in adverse effects to the sea lion or any other receptor.
--	Effluent	Ammonia	Total Ammonia		unc	unc							Uncertainty	Uncertainty exists for chemicals for which toxcity data was not identified for marine mammals. However, the low observed toxicity in sensitive sea urchin WET tests suggest aggregate toxcity of all contamiannts in effluent are not likely to affect aquatic organisms at the detected concentrations.
--	Effluent	Anti-acid reflux	Ranitidine		unc	unc								
--	Effluent	Antidepressant	10-hydroxy-amitriptyline		unc	unc								
--	Effluent	Antidiabetic drug	Glipizide		unc	unc								
--	Effluent	Antihypertensive	Valsartan		unc	unc								
--	Effluent	Antispasmodic, caffeine met	1,7-Dimethylxanthine		unc	unc								
--	Effluent	ChannelBlocker	Dehydronifedipine		unc	unc								
--	Effluent	ChannelBlocker	Desmethyldiltiazem		unc	unc								
--	Effluent	Oil & Grease	Oil and Grease, Total (HEM)		unc	unc								
--	Effluent	PFAS	PFHpA		unc	unc								
--	Effluent	PFAS	PFPeA		unc	unc								
--	Effluent	PFAS	PFPeS		unc	unc								
--	Effluent	Sex hormone	Estrone		unc	unc								
--	Effluent	SSRI Antidepressant	Norfluoxetine		unc	unc								
--	Effluent	SSRI Antidepressant	Paroxetine		unc	unc								
--	Effluent	SSRI Antidepressant	Sertraline		unc	unc								
--	Effluent	Steroidal Estrogen	Equilenin		unc	unc								
	Effluent	Streoid	Prednisone		unc	unc								
	Effluent	SVOCs/PAHs	1,2-Diphenylhydrazine		unc	unc								
	Effluent	VOCs	Chloroethane		unc	unc								

Notes:
-- not applicable
unc - Uncertainty
HQ - hazard quotient

Table C-23. Ecological Risk Evaluation Conclusions

AWWU Ecological Risk Evaluation

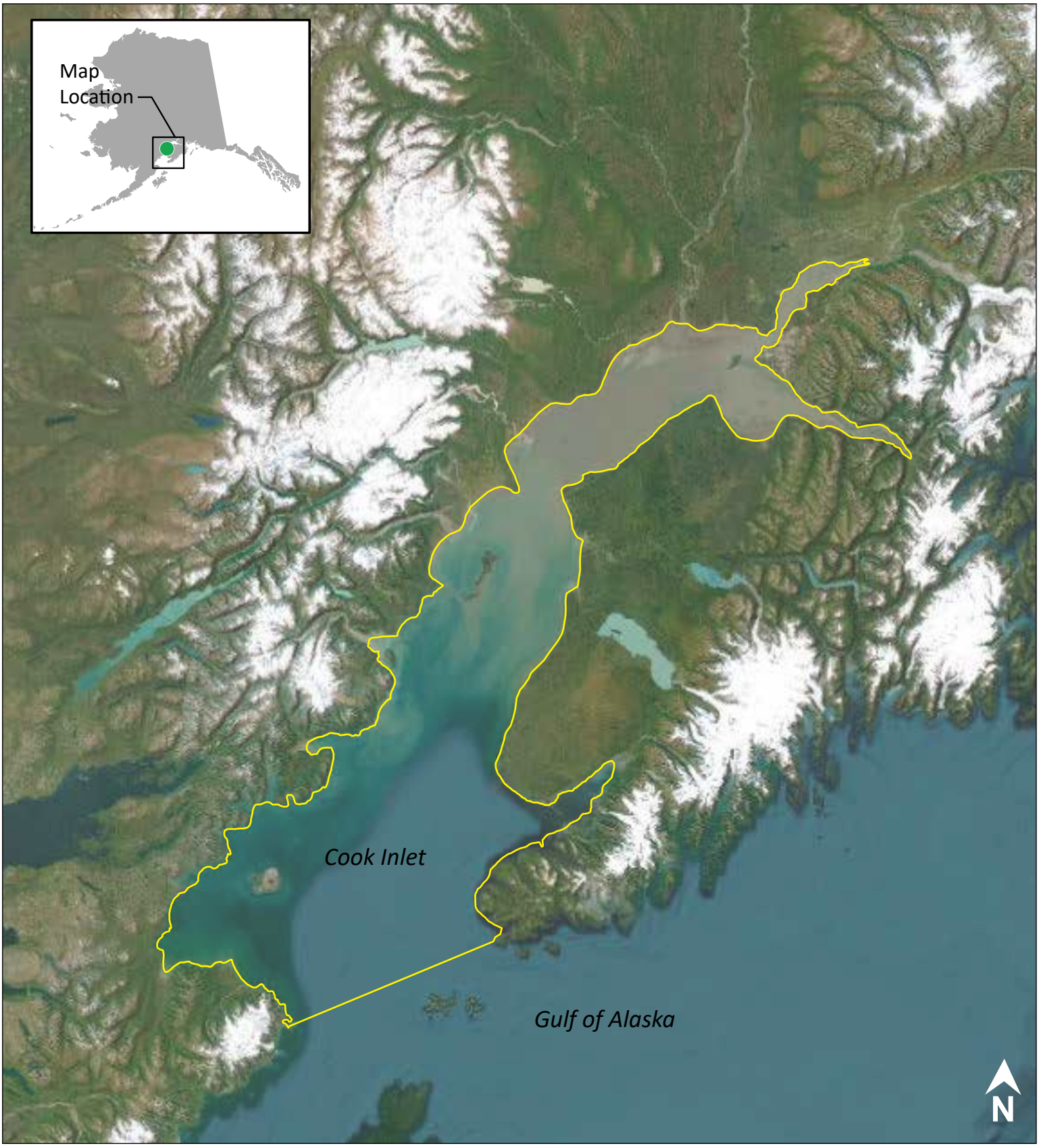
Receptor	Exposure Area					Effects Recommendation
	Edge of ZID	Mid Upper Cook Inlet	Knik Arm	Turnagain Arm	Cook Inlet	
Prey Species	none	none	none	none	--	No Likely Risk of Effects
Steller Sea Lion	none	none	none	none	none	No Likely Risk of Effects
Cook Inlet Beluga Whale	none	none	none	none	none	No Likely Risk of Effects

Notes:

--= not applicable, medium not evaluated for this exposure area

Receptor Groups Evaluated	Exposures Routes Evaluated
Prey Species	Potential for risk from direct contact with primary effluents in marine surface water
Steller Sea Lion	Potential for risk from bioaccumulation of contamiants in AWPCF effluent and Cook Inlet fish tissue
Cook Inlet Beluga Whale	Potential for risk from bioaccumulation of contamiants in AWPCF effluen and Cook Inlet fish tissue

Figures



Legend

Cook Inlet

0 30 mi

0 50 km

FIGURE C-1

Cook Inlet Overview

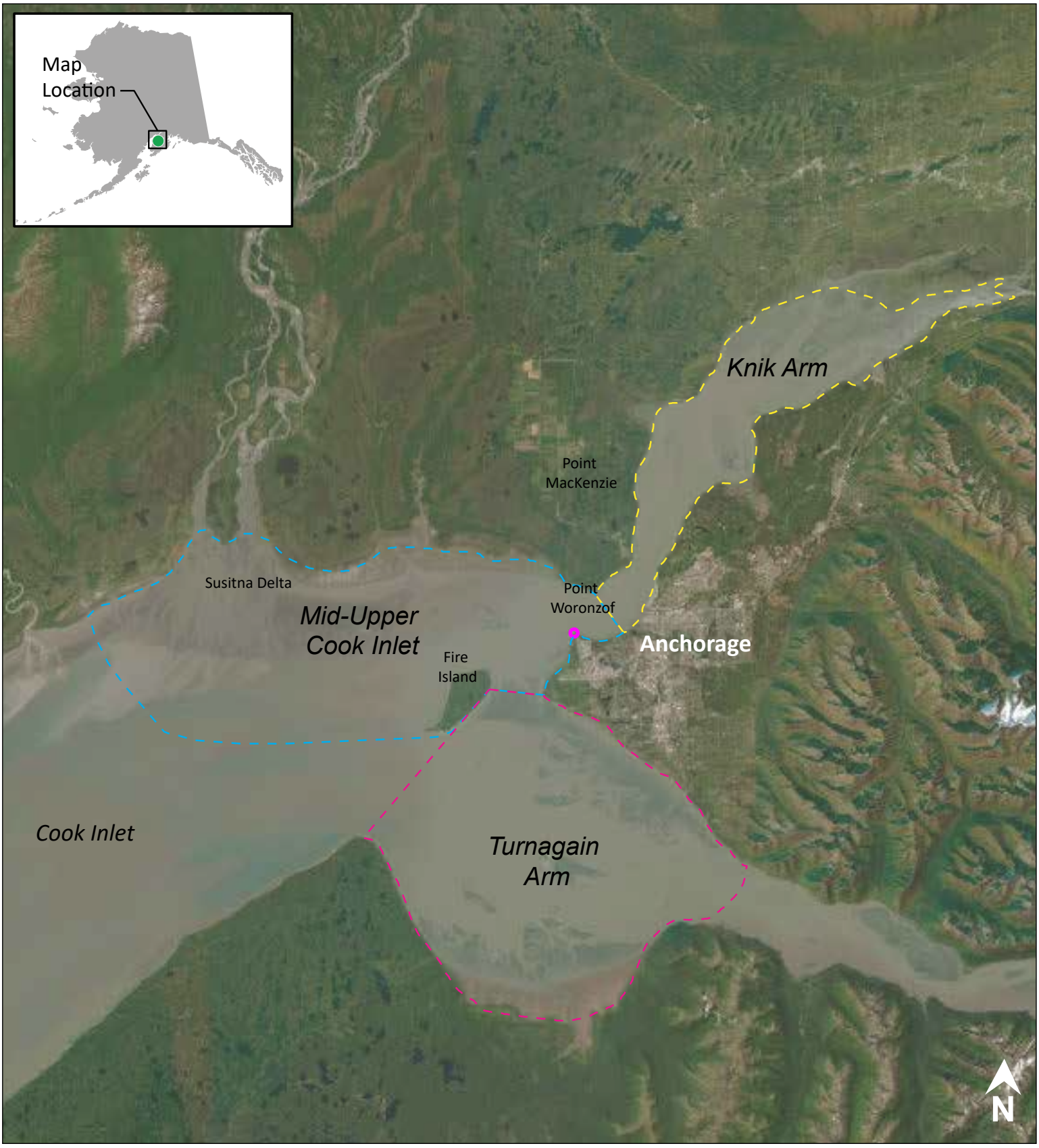
AWPCF Risk Evaluation Appendix C

Cook Inlet

Alaska

Kenai Peninsula Borough, State of Alaska, Esri, TomTom, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS, USFWS | Esri, USGS | Esri, USDA Farm Service Agency | Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Jacobs



Legend

- Turnagain Arm
- Mid-upper Cook Inlet
- Knik Arm

0 7.35 mi

0 10 km

FIGURE C-2

Cook Inlet Exposure Areas

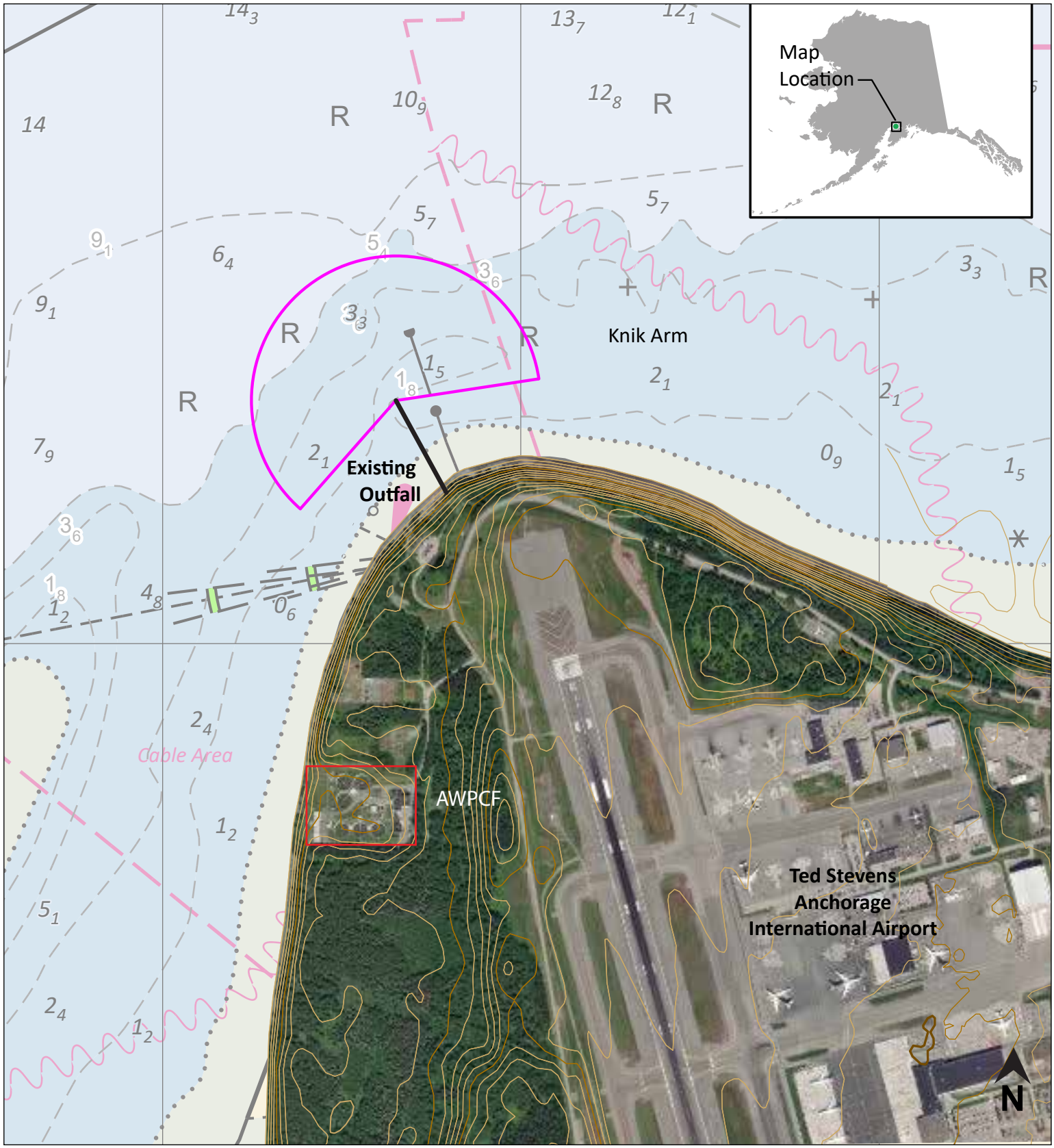
AWPCF Risk Evaluation Appendix C

Cook Inlet

Alaska

Esri, USGS | Kenai Peninsula Borough, Matanuska-Susitna Borough GIS, Municipality of Anchorage, State of Alaska, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS | Esri, USDA Farm Service Agency | Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Jacobs



Legend

ZID Boundary

FIGURE C-3

AWPCF Location and ZID Boundary

AWPCF Risk Evaluation Appendix C

Cook Inlet

Alaska

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Attachment C1
Effluent Data

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	0.5	0.057	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	0.5	0.057	0.79		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	0.5	0.044	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	0.5	0.044	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	0.5	0.044	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	0.5	0.044	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	5	0.85	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	1	0.17	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	5	0.85	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	5	0.85	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	0.5	0.07	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	5	0.07	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	0.5	0.07	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	0.5	0.07	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	0.5	0.07	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	1,1,1-Trichloroethane (TCA)	71-55-6	5	0.07	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.092	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.092	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.063	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.063	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.063	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.063	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	5	1.45	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	1	0.29	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	5	1.45	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	5	1.45	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.08	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	5	0.08	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.08	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.08	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	0.5	0.08	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	1,1,2,2-Tetrachloroethane	79-34-5	5	0.08	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	1,1,2-Trichloroethane	79-00-5	0.5	0.045	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	1,1,2-Trichloroethane	79-00-5	0.5	0.045	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	1,1,2-Trichloroethane	79-00-5	0.5	0.045	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	1,1,2-Trichloroethane	79-00-5	0.5	0.045	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	1,1,2-Trichloroethane	79-00-5	0.5	0.045	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	1,1,2-Trichloroethane	79-00-5	0.5	0.045	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	1,1,2-Trichloroethane	79-00-5	5	2	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	1,1,2-Trichloroethane	79-00-5	1	0.4	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	1,1,2-Trichloroethane	79-00-5	5	2	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	1,1,2-Trichloroethane	79-00-5	5	2	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	1,1,2-Trichloroethane	79-00-5	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	1,1,2-Trichloroethane	79-00-5	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	1,1,2-Trichloroethane	79-00-5	0.5	0.06	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	1,1,2-Trichloroethane	79-00-5	5	0.06	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	1,1,2-Trichloroethane	79-00-5	0.5	0.06	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	1,1,2-Trichloroethane	79-00-5	0.5	0.06	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	1,1,2-Trichloroethane	79-00-5	0.5	0.06	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	1,1,2-Trichloroethane	79-00-5	5	0.06	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	1,1,2-Trichlorotrifluoroethane	76-13-1	5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	1,1,2-Trichlorotrifluoroethane	76-13-1	5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	1,1,2-Trichlorotrifluoroethane	76-13-1	5	0.07	ND	ND	ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	1,1,2-Trichlorotrifluoroethane	76-13-1	5	0.07	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	1,1,2-Trichlorotrifluoroethane	76-13-1	5	0.07	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	1,1,2-Trichlorotrifluoroethane	76-13-1	5	0.07	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	1,1,2-Trichlorotrifluoroethane	76-13-1	5	0.07	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	1,1,2-Trichlorotrifluoroethane	76-13-1	5	0.07	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	1,1-Dichloroethane	75-34-3	0.5	0.025	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	1,1-Dichloroethane	75-34-3	0.5	0.025	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	1,1-Dichloroethane	75-34-3	0.5	0.025	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	1,1-Dichloroethane	75-34-3	0.5	0.025	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	1,1-Dichloroethane	75-34-3	0.5	0.025	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	1,1-Dichloroethane	75-34-3	0.5	0.025	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	1,1-Dichloroethane	75-34-3	5	1.5	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	1,1-Dichloroethane	75-34-3	5	1.5	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	1,1-Dichloroethane	75-34-3	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	1,1-Dichloroethane	75-34-3	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	1,1-Dichloroethane	75-34-3	0.5	0.07	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	1,1-Dichloroethane	75-34-3	5	0.07	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	1,1-Dichloroethane	75-34-3	0.5	0.07	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	1,1-Dichloroethane	75-34-3	0.5	0.07	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	1,1-Dichloroethane	75-34-3	0.5	0.07	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	1,1-Dichloroethane	75-34-3	5	0.07	ND	ND	ug/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	1,1-Dichloroethane	75-34-3	5	1.5	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	1,1-Dichloroethane	75-34-3	1	0.3	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	1,1-Dichloroethylene	75-35-4	0.5	0.039	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	1,1-Dichloroethylene	75-35-4	0.5	0.039	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	1,1-Dichloroethylene	75-35-4	0.5	0.039	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	1,1-Dichloroethylene	75-35-4	0.5	0.039	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	1,1-Dichloroethylene	75-35-4	0.5	0.039	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	1,1-Dichloroethylene	75-35-4	0.5	0.039	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	1,1-Dichloroethylene	75-35-4	5	0.8	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	1,1-Dichloroethylene	75-35-4	1	0.16	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	1,1-Dichloroethylene	75-35-4	5	0.8	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	1,1-Dichloroethylene	75-35-4	5	0.8	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	1,1-Dichloroethylene	75-35-4	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	1,1-Dichloroethylene	75-35-4	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	1,1-Dichloroethylene	75-35-4	0.5	0.08	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	1,1-Dichloroethylene	75-35-4	5	0.08	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	1,1-Dichloroethylene	75-35-4	0.5	0.08	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	1,1-Dichloroethylene	75-35-4	0.5	0.08	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	1,1-Dichloroethylene	75-35-4	0.5	0.08	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	1,1-Dichloroethylene	75-35-4	5	0.08	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	10	0.32	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	10	0.32	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	20	0.64	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	11	0.35	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	10	0.32	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	50	1.6	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	25.8	3.1	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	2	0.16	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	0.5	0.08	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	3.8	0.33	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	4	0.66	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	4.7	0.83	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	3.8	0.66	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307110-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	20	0.83	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	1,2,4-Trichlorobenzene	120-82-1	8	0.33	ND	ND	ug/L	Water	NA	10
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	1,2-Dichlorobenzene	95-50-1	0.5	0.086	ND	ND	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	1,2-Dichlorobenzene	95-50-1	0.5	0.086	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	1,2-Dichlorobenzene	95-50-1	0.5	0.086	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	1,2-Dichlorobenzene	95-50-1	0.5	0.086	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	1,2-Dichlorobenzene	95-50-1	0.5	0.086	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	1,2-Dichlorobenzene	95-50-1	0.5	0.086	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	1,2-Dichlorobenzene	95-50-1	25.8	3.3	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	1,2-Dichlorobenzene	95-50-1	5	2.4	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	1,2-Dichlorobenzene	95-50-1	1	0.48	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	1,2-Dichlorobenzene	95-50-1	5	2.4	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	1,2-Dichlorobenzene	95-50-1	5	2.4	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	1,2-Dichlorobenzene	95-50-1	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	1,2-Dichlorobenzene	95-50-1	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	1,2-Dichlorobenzene	95-50-1	0.5	0.06	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	1,2-Dichlorobenzene	95-50-1	5	0.06	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	1,2-Dichlorobenzene	95-50-1	0.5	0.06	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	1,2-Dichlorobenzene	95-50-1	0.5	0.06	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	1,2-Dichlorobenzene	95-50-1	0.5	0.06	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	1,2-Dichlorobenzene	95-50-1	5	0.06	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	1,2-Dichloroethane (EDC)	107-06-2	0.5	0.036	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	1,2-Dichloroethane (EDC)	107-06-2	0.5	0.036	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	1,2-Dichloroethane (EDC)	107-06-2	0.5	0.036	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	1,2-Dichloroethane (EDC)	107-06-2	0.5	0.036	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	1,2-Dichloroethane (EDC)	107-06-2	0.5	0.036	0.08	J	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	1,2-Dichloroethane (EDC)	107-06-2	5	1.1	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	1,2-Dichloroethane (EDC)	107-06-2	1	0.22	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	1,2-Dichloroethane (EDC)	107-06-2	5	1.1	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	1,2-Dichloroethane (EDC)	107-06-2	5	1.1	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	1,2-Dichloroethane (EDC)	107-06-2	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	1,2-Dichloroethane (EDC)	107-06-2	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	1,2-Dichloroethane (EDC)	107-06-2	0.5	0.06	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	1,2-Dichloroethane (EDC)	107-06-2	5	0.06	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	1,2-Dichloroethane (EDC)	107-06-2	0.5	0.06	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	1,2-Dichloroethane (EDC)	107-06-2	0.5	0.06	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	1,2-Dichloroethane (EDC)	107-06-2	0.5	0.06	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	1,2-Dichloroethane (EDC)	107-06-2	5	0.06	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	1,2-Dichloropropane	78-87-5	0.5	0.044	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	1,2-Dichloropropane	78-87-5	0.5	0.044	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	1,2-Dichloropropane	78-87-5	0.5	0.044	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	1,2-Dichloropropane	78-87-5	0.5	0.044	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	1,2-Dichloropropane	78-87-5	0.5	0.044	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	1,2-Dichloropropane	78-87-5	0.5	0.044	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	1,2-Dichloropropane	78-87-5	5	0.95	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	1,2-Dichloropropane	78-87-5	1	0.19	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	1,2-Dichloropropane	78-87-5	5	0.95	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	1,2-Dichloropropane	78-87-5	5	0.95	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	1,2-Dichloropropane	78-87-5	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	1,2-Dichloropropane	78-87-5	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	1,2-Dichloropropane	78-87-5	0.5	0.07	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	1,2-Dichloropropane	78-87-5	5	0.07	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	1,2-Dichloropropane	78-87-5	0.5	0.07	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	1,2-Dichloropropane	78-87-5	0.5	0.07	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	1,2-Dichloropropane	78-87-5	0.5	0.07	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	1,2-Dichloropropane	78-87-5	5	0.07	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	10	0.23	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	10	0.23	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	20	0.46	2.5	J	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	11	0.25	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	10	0.23	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	50	1.2	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	25.8	6.19	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	1	0.11	1.1		UG/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	0.5	0.11	ND	ND	UG/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	3.8	0.82	ND	ND	UG/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/28/2021	625.1		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	4	1.7	ND	ND	UG/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	4.7	2.1	ND	ND	UG/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	3.8	1.7	ND	ND	UG/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	20	2.1	ND	ND	UG/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	1,2-Diphenylhydrazine	122-66-7	8	0.82	ND	ND	UG/L	Water	NA	10
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	1,3-Dichlorobenzene	541-73-1	0.5	0.071	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	1,3-Dichlorobenzene	541-73-1	0.5	0.071	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	1,3-Dichlorobenzene	541-73-1	0.5	0.071	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	1,3-Dichlorobenzene	541-73-1	0.5	0.071	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	1,3-Dichlorobenzene	541-73-1	0.5	0.071	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	1,3-Dichlorobenzene	541-73-1	0.5	0.071	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	1,3-Dichlorobenzene	541-73-1	25.8	4.75	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	1,3-Dichlorobenzene	541-73-1	5	1.1	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	1,3-Dichlorobenzene	541-73-1	1	0.22	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	1,3-Dichlorobenzene	541-73-1	5	1.1	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	1,3-Dichlorobenzene	541-73-1	5	1.1	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	1,3-Dichlorobenzene	541-73-1	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	1,3-Dichlorobenzene	541-73-1	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	1,3-Dichlorobenzene	541-73-1	0.5	0.06	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	1,3-Dichlorobenzene	541-73-1	5	0.06	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	1,3-Dichlorobenzene	541-73-1	0.5	0.06	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	1,3-Dichlorobenzene	541-73-1	0.5	0.06	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	1,3-Dichlorobenzene	541-73-1	0.5	0.06	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	1,3-Dichlorobenzene	541-73-1	5	0.06	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	1,4-Dichlorobenzene	106-46-7	0.5	0.073	0.74		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	1,4-Dichlorobenzene	106-46-7	0.5	0.073	0.84		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	1,4-Dichlorobenzene	106-46-7	0.5	0.073	0.64		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	1,4-Dichlorobenzene	106-46-7	0.5	0.073	0.64		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	1,4-Dichlorobenzene	106-46-7	0.5	0.073	0.84		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	1,4-Dichlorobenzene	106-46-7	0.5	0.073	0.71		µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	1,4-Dichlorobenzene	106-46-7	25.8	4.7	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	1,4-Dichlorobenzene	106-46-7	5	0.8	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	1,4-Dichlorobenzene	106-46-7	1	0.16	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	1,4-Dichlorobenzene	106-46-7	5	0.8	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	1,4-Dichlorobenzene	106-46-7	5	0.8	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	1,4-Dichlorobenzene	106-46-7	0.5	0.01	0.38	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	1,4-Dichlorobenzene	106-46-7	0.5	0.01	0.27	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	1,4-Dichlorobenzene	106-46-7	0.5	0.09	0.38	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	1,4-Dichlorobenzene	106-46-7	5	0.09	0.75	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	1,4-Dichlorobenzene	106-46-7	0.5	0.09	0.41	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	1,4-Dichlorobenzene	106-46-7	0.5	0.09	0.39	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	1,4-Dichlorobenzene	106-46-7	0.5	0.09	0.34	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	1,4-Dichlorobenzene	106-46-7	5	0.09	0.42	J	ug/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7		0.66796	15.216		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7		0.66796	7.9684		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7		0.66796	9.3372		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7		0.66796	18.581		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7		0.67	14.144		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7		0.67	20.29		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7		0.67	51.994		ng/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7		0.67	19.059		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1,6,7-Trimethylnaphthalene	2245-38-7		0.67	20.559		ng/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	1,7-Dimethylxanthine	611-59-6	NA	1.68	57.8		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	1,7-Dimethylxanthine	611-59-6	5.96	NA	16200		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	10-hydroxy-amitriptyline	1159-82-6	NA	0.00063	0.0192		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	10-hydroxy-amitriptyline	1159-82-6	0.26	NA	11.3		ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	11Cl-PF3OUdS	2196242-82-5	5.44	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	17 alpha-Dihydroequilin	651-55-8	2.95	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	17 alpha-Estradiol	57-91-0	7.95	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	17 alpha-Ethinyl-Estradiol	57-63-6	22.9	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	17 beta-Estradiol	50-28-2	4.61	NA	5.52		ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	17 beta-Estradiol 3-benzoate	50-50-0	0.795	NA	ND	U	ng/L	Aqueous	NA	NA
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	18a-Oleanane	30759-92-3		8.19374	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	18a-Oleanane	30759-92-3		8.19374	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	18a-Oleanane	30759-92-3		8.19374	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	18a-Oleanane	30759-92-3		8.19374	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	18a-Oleanane	30759-92-3		8.19	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	18a-Oleanane	30759-92-3		8.19	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	18a-Oleanane	30759-92-3		8.19	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	18a-Oleanane	30759-92-3		8.19	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	18a-Oleanane	30759-92-3		8.19	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4		0.96569	6.1175		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4		0.96569	2.6405		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4		0.96569	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4		0.96569	3.283		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4		0.97	14.437		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4		0.97	15.803		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4		0.97	16.342		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4		0.97	15.018		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methyldibenzothiophene	31317-07-4		0.97	14.423		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	1-Methylfluorene	1730-37-6		1.47005	31.82		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	1-Methylfluorene	1730-37-6		1.47005	15.174		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	1-Methylfluorene	1730-37-6		1.47005	17.444		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	1-Methylfluorene	1730-37-6		1.47005	30.32		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylfluorene	1730-37-6		1.47	12.939		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylfluorene	1730-37-6		1.47	22.035		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylfluorene	1730-37-6		1.47	22.543		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylfluorene	1730-37-6		1.47	16.314		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylfluorene	1730-37-6		1.47	21.407		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	1-Methylnaphthalene	90-12-0		1.41883	108.49		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	1-Methylnaphthalene	90-12-0		1.41883	65.034		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	1-Methylnaphthalene	90-12-0		1.41883	44.437		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	1-Methylnaphthalene	90-12-0		1.41883	71.482		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylnaphthalene	90-12-0		1.42	52.355		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylnaphthalene	90-12-0		1.42	49.932		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylnaphthalene	90-12-0		1.42	426.81		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylnaphthalene	90-12-0		1.42	51.412		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylnaphthalene	90-12-0		1.42	58.862		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	1-Methylphenanthrene	832-69-9		0.93899	22.049		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	1-Methylphenanthrene	832-69-9		0.93899	21.023		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	1-Methylphenanthrene	832-69-9		0.93899	22.142		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	1-Methylphenanthrene	832-69-9		0.93899	28.492		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylphenanthrene	832-69-9		0.94	16.625		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylphenanthrene	832-69-9		0.94	20.44		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylphenanthrene	832-69-9		0.94	20.974		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylphenanthrene	832-69-9		0.94	15.003		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	1-Methylphenanthrene	832-69-9		0.94	20.424		ng/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',3,3',4,4',5,5',6,6'-DeBDE	1163-19-5	NA	0.00232	0.0258		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',3,3',4,4',5,6,6'-NoBDE		NA	0.00041	0.0052		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	BDEs	2,2',3,3',4,4'-HxBDE		NA	0.0001		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',3,4,4',5,5',6-OcBDE		NA	0.00014	0.0014		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',3,4,4',5,6-HpBDE		NA	6.2E-05		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',3,4,4',5,6-HpBDE	207122-16-5	NA	3.1E-05	0.0007		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',3,4,4',5'-HxBDE	182677-30-1	NA	3.6E-05	0.0005	C	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',3,4,4',6'-HxBDE	243982-83-4	NA	4.1E-05	0.0002		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',3,4,4'-PeBDE	182346-21-0	NA	5.5E-05	0.0018		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',4,4',5,5'-HxBDE	68631-49-2	NA	2.7E-05	0.0036		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',4,4',5,6'-HxBDE	207122-15-4	NA	3.4E-05	0.0031		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',4,4',5-PeBDE	60348-60-9	NA	7.6E-05	0.0406		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',4,4',6,6'-HxBDE	35854-94-5	NA	2.2E-05	0.0002		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',4,4',6-PeBDE	189084-64-8	NA	2.7E-05	0.0081		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',4,4'-TeBDE	5436-43-1	NA	6.7E-05	0.0432		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',4,5'-TeBDE	243982-82-3	NA	3E-05	0.0016		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',4,6'-TeBDE		NA	2E-05	0.0002		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,2',4-TriBDE	147217-75-2	NA	5.2E-05	0.0011	C	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	BDEs	2,3,3',4,4'-PeBDE		NA	9.7E-05		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,3',4,4',6-PeBDE	189084-66-0	NA	6E-05	0.0002	C	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,3',4,4'-TeBDE	189084-61-5	NA	1.9E-05	0.0015		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	BDEs	2,3,4,5,6-PeBDE	189084-65-9	NA	0.00013		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,3',4',6-TeBDE	189084-62-6	NA	2.5E-05	0.0006		ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8290		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	5E-06	8.5E-07	ND	ND	µg/L	Water	NA	1
2015	ALS_PACE	10311964002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8290		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	2E-06		ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8290		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	5E-06	6.4E-07	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8290		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	6E-06	1.2E-06	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8290		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	6E-06	1.2E-06	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8290		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	5E-06	2.7E-06	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806164-014	MOA18DXN002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	8290		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	5E-06	1.4E-06	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1807985-008	MOA18DXN005	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	8290		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	5E-06	2.8E-06	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-001	M19D-DXN-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8290		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	5E-06	2.4E-06	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908294-001	M19W-DXN-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8290		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	5E-06	4.8E-06	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	L2468074-2	M20D-DXN-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	EPA 1613B		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	3E-07	2.9E-07	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	L2489077-2	M20W-DXN-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	EPA 1613B		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	6E-07	5.6E-07	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	L2601703-2	M21D-DXN-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	EPA 1613B		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	2E-06	1.5E-06	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-002	M21W-DXN-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	EPA 1613B		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	5E-06	2.9E-06	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206846-002	M22D-DXN-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	EPA 1613B		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	5E-06	5.1E-06	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209202-002	M22W-DXN-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	EPA 1613B		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	5E-06	5E-06	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	L2751500-2	M23D-DXN-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	EPA 1613B		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	1E-05	3.5E-07	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	L2752278-2	M23W-DXN-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	EPA 1613B		Dioxin	2,3,7,8-Tetrachlorodibenzo-p-dioxir	1746-01-6	9E-06	4.1E-07	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	2,4,4'-TriBDE	41318-75-6	NA	3.8E-05	0.0014	C	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	BDEs	2,4,6-TriBDE	155999-95-4	NA	4.4E-05		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	BDEs	2,4',6-TriBDE	189084-60-4	NA	3.6E-05		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	10	0.19	1.1	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	10	0.19	1.1	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	20	0.38	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	11	0.21	0.86	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	10	0.19	0.61	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	50	0.95	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	25.8	4.59	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	5	0.58	0.59	J	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	1.3	0.29	1.2	J	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	3.8	3	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	6	6	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	7.5	7.5	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	6	6	ND	ND	ug/L	Water	NA	20

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	20	7.5	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	2,4,6-Trichlorophenol	88-06-2	8	3	ND	ND	ug/L	Water	NA	10
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	2,4'-DDD	53-19-0	NA	0.00014	0.0011		ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	2,4'-DDE	3424-82-6	NA	0.00024		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	2,4'-DDT	789-02-6	NA	0.0003		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	BDEs	2,4'-DiBDE	147217-71-8	NA	47.6		C U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	10	0.29	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	10	0.29	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	20	0.58	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	11	0.31	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	10	0.29	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	50	1.5	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	25.8	6.19	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	5	0.47	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	1.3	0.24	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	3.8	1.1	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	4	2.2	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	4.7	2.7	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	3.8	2.2	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	20	2.7	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	2,4-Dichlorophenol	120-83-2	8	1.1	ND	ND	ug/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	10	1.1	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	10	1.1	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	20	2.2	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	11	1.2	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	10	1.1	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	50	5.5	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	25.8	7.74	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	40	22	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	11	11	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	3.8	2	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	4	3.9	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	4.9	4.9	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	3.9	3.9	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	20	4.9	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	2,4-Dimethylphenol	105-67-9	8	2	ND	ND	ug/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	25	1	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	25	1	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	50	2	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	27	1.1	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	25	1	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	130	5	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	103	3.92	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	40	1.7	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	10	0.85	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	19	18	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	40	35	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	44	44	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	35	35	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	100	44	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	2,4-Dinitrophenol	51-28-5	40	18	ND	ND	ug/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	10	0.26	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	10	0.26	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	20	0.52	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	11	0.28	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	10	0.26	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	50	1.3	ND	ND	µg/L	Water	NA	5

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	25.8	6.71	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	50	13	ND	ND	µg/L	Water	NA	10
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	99	26	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	498	130	ND	ND	ug/L	Water	NA	100
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	2	0.18	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	0.5	0.09	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	3.8	1.9	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	10	3.7	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	4.7	4.6	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	3.8	3.7	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	20	4.6	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	2,4-Dinitrotoluene	121-14-2	8	1.9	ND	ND	ug/L	Water	NA	10
2010	AXYS	NA	EFFPBDE-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	BDEs	2,6-DiBDE	51930-04-2	NA	28.2		U	ug/L	Water	NA	NA
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0		0.6963	85.309		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0		0.6963	21.945		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0		0.6963	25.784		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0		0.6963	57.352		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0		0.7	37.659		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0		0.7	40.573		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0		0.7	343.63		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0		0.7	59.318		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2,6-Dimethylnaphthalene	581-42-0		0.7	92.239		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	10	0.27	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	20	0.54	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	11	0.29	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	10	0.27	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	50	1.4	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	25.8	5.68	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	2	0.33	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	0.5	0.17	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	3.8	1.7	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	10	3.3	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	4.7	4.1	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	3.8	3.3	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	20	4.1	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	2,6-Dinitrotoluene	606-20-2	8	1.7	ND	ND	ug/L	Water	NA	10
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	2/3-Methyldibenzothiophene	16587-52-3		0.96569	24.817		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	2/3-Methyldibenzothiophene	16587-52-3		0.96569	21.396		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	2/3-Methyldibenzothiophene	16587-52-3		0.96569	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	2/3-Methyldibenzothiophene	16587-52-3		0.96569	9.553		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2/3-Methyldibenzothiophene	16587-52-3		0.97	12.03		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2/3-Methyldibenzothiophene	16587-52-3		0.97	13.723		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2/3-Methyldibenzothiophene	16587-52-3		0.97	14.284		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2/3-Methyldibenzothiophene	16587-52-3		0.97	8.375		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2/3-Methyldibenzothiophene	16587-52-3		0.97	10.101		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	M0A15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	2-Butanone (MEK)	78-93-3	20	3	51		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	2-Butanone (MEK)	78-93-3	20	3	14	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	M0A16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	2-Butanone (MEK)	78-93-3	20	3	22		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	2-Butanone (MEK)	78-93-3	20	3	44		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	2-Butanone (MEK)	78-93-3	20	3	7	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	2-Butanone (MEK)	78-93-3	20	3	68		µg/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	2-Butanone (MEK)	78-93-3	20	0.01	24		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	2-Butanone (MEK)	78-93-3	20	0.01	21		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	2-Butanone (MEK)	78-93-3	20	2	20	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	2-Butanone (MEK)	78-93-3	20	2	20		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	2-Butanone (MEK)	78-93-3	20	2	18	J	ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	2-Butanone (MEK)	78-93-3	20	2	19	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	2-Butanone (MEK)	78-93-3	20	2	19	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	2-Butanone (MEK)	78-93-3	20	2	14	J	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.12	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.12	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.12	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.12	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.12	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.12	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	125	11	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	25	2.2	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	125	11	ND	U,J-	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	125	11	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.2	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.2	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.2	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	2-Chloroethyl Vinyl Ether	110-75-8	10	0.2	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	10	0.43	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	10	0.86	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	11	0.46	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	10	0.43	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	50	2.2	ND	ND	µg/L	Water	NA	5
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	25.8	23.8	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	2	0.41	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	0.5	0.21	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	3.8	0.38	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	4	0.76	ND	ND	ug/L	Water	NA	20
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	4.7	0.95	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	3.8	0.76	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	20	0.95	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	8	0.38	ND	ND	ug/L	Water	NA	10
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	2-Chloronaphthalene	91-58-7	10	0.42	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	2-Chlorophenol	95-57-8	10	0.42	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	2-Chlorophenol	95-57-8	10	0.42	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	2-Chlorophenol	95-57-8	20	0.84	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	2-Chlorophenol	95-57-8	11	0.45	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	2-Chlorophenol	95-57-8	10	0.42	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	2-Chlorophenol	95-57-8	50	2.1	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	2-Chlorophenol	95-57-8	25.8	6.19	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	2-Chlorophenol	95-57-8	50	12	ND	ND	µg/L	Water	NA	10
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	2-Chlorophenol	95-57-8	99	24	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	2-Chlorophenol	95-57-8	498	120	ND	ND	ug/L	Water	NA	100
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	2-Chlorophenol	95-57-8	5	0.54	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	2-Chlorophenol	95-57-8	1.3	0.27	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	2-Chlorophenol	95-57-8	3.8	0.57	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	2-Chlorophenol	95-57-8	4	1.2	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	2-Chlorophenol	95-57-8	4.7	1.5	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	2-Chlorophenol	95-57-8	3.8	1.2	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	2-Chlorophenol	95-57-8	20	1.5	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	2-Chlorophenol	95-57-8	8	0.57	ND	ND	ug/L	Water	NA	10
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	2-Hexanone	591-78-6	20	2.5	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	2-Hexanone	591-78-6	20	2.5	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	2-Hexanone	591-78-6	20	2.5	ND	ND	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	2-Hexanone	591-78-6	20	2.5	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	2-Hexanone	591-78-6	20	2.5	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	2-Hexanone	591-78-6	20	2.5	ND	ND	µg/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	2-Hexanone	591-78-6	20	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	2-Hexanone	591-78-6	20	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	2-Hexanone	591-78-6	20	0.8	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	2-Hexanone	591-78-6	20	0.8	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	2-Hexanone	591-78-6	20	0.8	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	2-Hexanone	591-78-6	20	0.8	5.7	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	2-Hexanone	591-78-6	20	0.8	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	2-Hexanone	591-78-6	20	0.8	3.3	J	ug/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	2-Hydroxy-ibuprofen	51146-55-5	NA	0.182	38.7		ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	2-Methyl-4,6-dinitrophenol	534-52-1	25	2.3	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	2-Methyl-4,6-dinitrophenol	534-52-1	50	4.6	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	2-Methyl-4,6-dinitrophenol	534-52-1	27	2.5	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	2-Methyl-4,6-dinitrophenol	534-52-1	25	2.3	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	2-Methyl-4,6-dinitrophenol	534-52-1	130	12	ND	ND	µg/L	Water	NA	5
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	2-Methylanthracene	613-12-7		0.93899	63.558		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	2-Methylanthracene	613-12-7		0.93899	4.9792		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	2-Methylanthracene	613-12-7		0.93899	7.9183	J	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	2-Methylanthracene	613-12-7		0.93899	9.804		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylanthracene	613-12-7		0.94	4.247		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylanthracene	613-12-7		0.94	6.238		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylanthracene	613-12-7		0.94	6.837		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylanthracene	613-12-7		0.94	6.094		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylanthracene	613-12-7		0.94	7.443		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	2-Methylfluoranthene	33543-31-6		1.14514	15.195		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	2-Methylfluoranthene	33543-31-6		1.14514	8.2942		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	2-Methylfluoranthene	33543-31-6		1.14514	12.938		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	2-Methylfluoranthene	33543-31-6		1.14514	17.426		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylfluoranthene	33543-31-6		1.15	7.797		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylfluoranthene	33543-31-6		1.15	9.871		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylfluoranthene	33543-31-6		1.15	8.998		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylfluoranthene	33543-31-6		1.15	6.436		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylfluoranthene	33543-31-6		1.15	9.785		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	2-Methylnaphthalene	91-57-6		1.10199	152.85		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	2-Methylnaphthalene	91-57-6		1.1	78.785		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	2-Methylnaphthalene	91-57-6		1.10199	56.065		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	2-Methylnaphthalene	91-57-6		1.10199	100.22		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylnaphthalene	91-57-6		1.1	72.595		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylnaphthalene	91-57-6		1.1	66.406		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylnaphthalene	91-57-6		1.1	540.96		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylnaphthalene	91-57-6		1.1	60.937		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylnaphthalene	91-57-6		1.1	73.164		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	2-Methylphenanthrene	2531-84-2		0.93899	57.962		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	2-Methylphenanthrene	2531-84-2		0.93899	43.274		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	2-Methylphenanthrene	2531-84-2		0.93899	39.078		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	2-Methylphenanthrene	2531-84-2		0.93899	64.745		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylphenanthrene	2531-84-2		0.94	29.361		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylphenanthrene	2531-84-2		0.94	34.855		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylphenanthrene	2531-84-2		0.94	36.206		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylphenanthrene	2531-84-2		0.94	25.955		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	2-Methylphenanthrene	2531-84-2		0.94	39.409		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	2-Nitrophenol	88-75-5	10	0.35	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	2-Nitrophenol	88-75-5	10	0.35	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	2-Nitrophenol	88-75-5	20	0.7	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	2-Nitrophenol	88-75-5	11	0.38	ND	ND	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	2-Nitrophenol	88-75-5	10	0.35	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	2-Nitrophenol	88-75-5	50	1.8	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	2-Nitrophenol	88-75-5	103	7.22	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	2-Nitrophenol	88-75-5	5	0.63	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	2-Nitrophenol	88-75-5	1.3	0.32	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	2-Nitrophenol	88-75-5	3.8	0.86	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	2-Nitrophenol	88-75-5	10	1.8	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	2-Nitrophenol	88-75-5	4.7	2.2	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	2-Nitrophenol	88-75-5	3.8	1.8	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	2-Nitrophenol	88-75-5	20	2.2	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	2-Nitrophenol	88-75-5	8	0.86	ND	ND	ug/L	Water	NA	10
2010	AXYS	NA	EFFPBDE-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	BDEs	3,3',4,4',5-PeBDE		NA	49.7		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	BDEs	3,3',4-TriBDE	147217-80-9	NA	39.4		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	25	0.48	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	25	0.48	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	50	0.96	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	27	0.52	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	25	0.48	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	130	2.4	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	103	7.22	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	20	4.3	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	5	2.2	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	3.8	0.89	ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	4.7	2.3	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	3.8	1.8	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	20	2.3	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	3,3'-Dichlorobenzidine	91-94-1	8	0.89	ND	ND	ug/L	Water	NA	10
2010	AXYS	NA	EFFPBDE-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	BDEs	3,4-DiBDE	189084-59-1	NA	77.1		C U	ug/L	Water	NA	NA
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6		1.6685	18.873		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6		1.6685	13.662		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6		1.6685	8.7154	J	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6		1.6685	12.746		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6		1.67	6.866		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6		1.67	7.278		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6		1.67	6.129		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6		1.67	5.461		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	3,6-Dimethylphenanthrene	1576-67-6		1.67	10.92		ng/L	Water	NA	1
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	3:3 FTCA	1169706-83-5	5.43	NA	ND	U	ng/L	Aqueous	NA	NA
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	3-Methylphenanthrene	832-71-3		0.93899	50.159		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	3-Methylphenanthrene	832-71-3		0.93899	32.997		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	3-Methylphenanthrene	832-71-3		0.93899	40.569		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	3-Methylphenanthrene	832-71-3		0.93899	57.917		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	3-Methylphenanthrene	832-71-3		0.94	24.479		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	3-Methylphenanthrene	832-71-3		0.94	37.867		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	3-Methylphenanthrene	832-71-3		0.94	31.228		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	3-Methylphenanthrene	832-71-3		0.94	32.289		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	3-Methylphenanthrene	832-71-3		0.94	44.812		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	4,4'-DDD	72-54-8	0.018	0.018	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	4,4'-DDD	72-54-8	0.011	0.0016	0.0052	J,P	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	4,4'-DDD	72-54-8	0.01	0.0015	0.0049	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	4,4'-DDD	72-54-8	0.011	0.0039	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	4,4'-DDD	72-54-8	0.01	0.003	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	4,4'-DDD	72-54-8	0.01	0.003	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	4,4'-DDD	72-54-8	0.1	0.027	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	4,4'-DDD	72-54-8	0.1	0.028	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	4,4'-DDD	72-54-8	0.02	0.02	ND	ND	ug/L	Water	NA	10

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	4,4'-DDD	72-54-8	0.025	0.007	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	4,4'-DDD	72-54-8	0.0055	0.0055	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	4,4'-DDD	72-54-8	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	4,4'-DDD	72-54-8	0.048	0.0057	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	4,4'-DDD	72-54-8	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	4,4'-DDD	72-54-8	0.0075	0.0075	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	4,4'-DDD	72-54-8	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	4,4'-DDD	72-54-8	0.005	0.005	0.021	P	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	4,4'-DDD	72-54-8	0.005	0.005	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	4,4'-DDE	72-55-9	0.011	0.0042	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	4,4'-DDE	72-55-9	0.011	0.00038	0.0021	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	4,4'-DDE	72-55-9	0.01	0.00036	0.0047	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	4,4'-DDE	72-55-9	0.011	0.00037	0.0021	J,P	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	4,4'-DDE	72-55-9	0.01	0.0048	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	4,4'-DDE	72-55-9	0.01	0.0048	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	4,4'-DDE	72-55-9	0.1	0.027	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	4,4'-DDE	72-55-9	0.1	0.028	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	4,4'-DDE	72-55-9	0.02	0.02	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	4,4'-DDE	72-55-9	0.025	0.0028	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	4,4'-DDE	72-55-9	0.0055	0.0055	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	4,4'-DDE	72-55-9	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	4,4'-DDE	72-55-9	0.048	0.0046	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	4,4'-DDE	72-55-9	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	4,4'-DDE	72-55-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	4,4'-DDE	72-55-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	4,4'-DDE	72-55-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	4,4'-DDE	72-55-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	4,4'-DDT	50-29-3	0.011	0.0042	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	4,4'-DDT	50-29-3	0.011	0.0085	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	4,4'-DDT	50-29-3	0.014	0.014	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	4,4'-DDT	50-29-3	0.011	0.0098	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	4,4'-DDT	50-29-3	0.01	0.0048	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	4,4'-DDT	50-29-3	0.01	0.0048	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	4,4'-DDT	50-29-3	0.1	0.027	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	4,4'-DDT	50-29-3	0.1	0.028	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	4,4'-DDT	50-29-3	0.025	0.012	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	4,4'-DDT	50-29-3	0.02	0.02	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	4,4'-DDT	50-29-3	0.0055	0.0055	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	4,4'-DDT	50-29-3	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	4,4'-DDT	50-29-3	0.048	0.021	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	4,4'-DDT	50-29-3	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	4,4'-DDT	50-29-3	0.005	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	4,4'-DDT	50-29-3	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	4,4'-DDT	50-29-3	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	4,4'-DDT	50-29-3	0.005	0.005	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	4,4'-DDT	50-29-3	NA	0.00016	0.0002		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPBDE-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	BDEs	4,4'-DiBDE	2050-47-7	NA	25.2		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	25	2.3	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	103	5.16	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	20	0.25	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	5	0.13	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	17	17	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	34	34	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	42	42	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	34	34	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	50	42	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	4,6-Dinitro-2-methylphenol	534-52-1	20	17	ND	ND	ug/L	Water	NA	10

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	4/9-Methylphenanthrene	832-64-4		0.93899	34.955		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	4/9-Methylphenanthrene	832-64-4		0.93899	26.114		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	4/9-Methylphenanthrene	832-64-4		0.93899	21.348		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	4/9-Methylphenanthrene	832-64-4		0.93899	31.692		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	4/9-Methylphenanthrene	832-64-4		0.94	19.891		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	4/9-Methylphenanthrene	832-64-4		0.94	24.045		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	4/9-Methylphenanthrene	832-64-4		0.94	25.816		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	4/9-Methylphenanthrene	832-64-4		0.94	17.353		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	4/9-Methylphenanthrene	832-64-4		0.94	23.656		ng/L	Water	NA	1
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	4:2 FTS	414911-30-1	5.43	NA	ND	U	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	10	0.35	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	10	0.35	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	20	0.7	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	11	0.38	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	10	0.35	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	50	1.8	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	25.8	6.71	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	2	0.26	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	0.5	0.13	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	3.8	0.56	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	4	1.2	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	4.7	1.4	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	3.8	1.2	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	20	1.4	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	4-Bromophenyl Phenyl Ether	101-55-3	8	0.56	ND	ND	ug/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	10	0.48	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	10	0.48	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	20	0.96	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	11	0.52	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	10	0.48	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	50	2.4	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	25.8	9.28	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	50	18	ND	ND	µg/L	Water	NA	10
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	99	36	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	498	180	ND	ND	ug/L	Water	NA	100
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	5	0.37	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	1.3	0.19	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	3.8	1.8	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	4	3.6	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	4.7	4.4	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	3.8	3.6	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	20	4.4	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	4-Chloro-3-methylphenol	59-50-7	8	1.8	ND	ND	ug/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	10	0.26	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	10	0.26	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	20	0.52	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	11	0.28	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	10	0.26	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	50	1.3	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	25.8	4.95	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	2	0.27	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	0.5	0.14	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	3.8	0.51	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	4	1.1	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	4.7	1.3	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	3.8	1.1	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	20	1.3	ND	ND	ug/L	Water	NA	25

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	4-Chlorophenyl Phenyl Ether	7005-72-3	8	0.51	ND	ND	ug/L	Water	NA	10
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	4-Epianhydrochlortetracycline [EAC	158018-53-2	NA	0.257		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	4-Epianhydrotetracycline [EATC]	4465-65-0	NA	0.0716		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	4-Epichlortetracycline [ECTC]	14297-93-9	NA	0.0153		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	4-Epioxytetracycline [EOTC]	14206-58-7	NA	0.0161		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	4-Epitetracycline [ETC]	23313-80-6	NA	0.00925	0.0662		ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	2.7	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	2.7	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	2.8	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	2.8	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	2.8	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	2.8	ND	ND	µg/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	2	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	2	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	2	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	4-Methyl-2-pentanone (MIBK)	108-10-1	20	2	ND	ND	ug/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5		0.96569	22.921		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5		0.96569	16.888		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5		0.96569	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5		0.96569	11.434		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5		0.97	9.631		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5		0.97	12.609		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5		0.97	11.571		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5		0.97	8.017		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	4-Methyldibenzothiophene	7372-88-5		0.97	10.519		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	4-Nitrophenol	100-02-7	25	2.3	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	4-Nitrophenol	100-02-7	25	2.3	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	4-Nitrophenol	100-02-7	50	4.6	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	4-Nitrophenol	100-02-7	27	2.5	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	4-Nitrophenol	100-02-7	25	2.3	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	4-Nitrophenol	100-02-7	130	12	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	4-Nitrophenol	100-02-7	103	9.28	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	4-Nitrophenol	100-02-7	20	2.8	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	4-Nitrophenol	100-02-7	5	1.4	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	4-Nitrophenol	100-02-7	18	18	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	4-Nitrophenol	100-02-7	36	36	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	4-Nitrophenol	100-02-7	45	45	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	4-Nitrophenol	100-02-7	36	36	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	4-Nitrophenol	100-02-7	50	45	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	4-Nitrophenol	100-02-7	20	18	ND	ND	ug/L	Water	NA	10
2023	SGS AXYS - Canada	NA	A23-ALK-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-004 Rev	NA	Alkylphenols	4-n-Octylphenol	1806-26-4	5.84	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFNP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Alkylphenols	4-Nonylphenol diethoxylates	20427-84-3	NA	0.0897	6		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-ALK-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-004 Rev	NA	Alkylphenols	4-Nonylphenol diethoxylates	20427-84-3	10.1	NA	1470		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFNP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Alkylphenols	4-Nonylphenol monoethoxylates	104-35-8	NA	0.0164	10.1		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-ALK-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-004 Rev	NA	Alkylphenols	4-Nonylphenol monoethoxylates		30.8	NA	10300		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFNP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Alkylphenols	4-Nonylphenols	104-40-5	NA	0.0348	14.6		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-ALK-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-004 Rev	NA	Alkylphenols	4-Nonylphenols	84852-15-3	13.3	NA	5670		ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	5:3 FTCA	1799325-94-2	34	NA	59.2	J	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	6:2 FTS	425670-75-3	4.9	NA	ND	UB	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PPD-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-118 Rev	NA	6PPD-Quinone	6PPD-Quinone		0.403	NA	5.3		ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	7:3 FTCA	1799325-95-3	34	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	8:2 FTS	481071-78-7	4.62	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	9Cl-PF3ONS	1621485-21-9	5.45	NA	ND	U	ng/L	Aqueous	NA	NA

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Acenaphthene	83-32-9	10	0.27	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Acenaphthene	83-32-9	10	0.27	ND	ND	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Acenaphthene	83-32-9		1.43744	51.917		ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Acenaphthene	83-32-9	20	0.54	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Acenaphthene	83-32-9	11	0.29	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Acenaphthene	83-32-9		1.43744	31.377		ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Acenaphthene	83-32-9	10	0.27	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Acenaphthene	83-32-9	50	1.4	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Acenaphthene	83-32-9		1.43744	43.108		ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Acenaphthene	83-32-9	25.8	21.7	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Acenaphthene	83-32-9	50	42	ND	ND	µg/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Acenaphthene	83-32-9		1.43744	82.012		ng/L	Water	NA	1
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Acenaphthene	83-32-9	99	84	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Acenaphthene	83-32-9	498	420	ND	ND	ug/L	Water	NA	100
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Acenaphthene	83-32-9		1.44	38.277		ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Acenaphthene	83-32-9	2	0.26	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Acenaphthene	83-32-9	0.5	0.13	ND	ND	ug/L	Water	NA	5
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Acenaphthene	83-32-9		1.44	61.855		ng/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Acenaphthene	83-32-9	3.8	0.38	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Acenaphthene	83-32-9	4	0.75	ND	ND	ug/L	Water	NA	20
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Acenaphthene	83-32-9		1.44	82.071		ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Acenaphthene	83-32-9	4.7	0.93	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Acenaphthene	83-32-9	3.8	1.1	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Acenaphthene	83-32-9		1.44	65.432		ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Acenaphthene	83-32-9	20	0.93	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Acenaphthene	83-32-9	8	0.38	ND	ND	ug/L	Water	NA	10
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Acenaphthene	83-32-9		1.44	72.435		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Acenaphthylene	208-96-8	10	0.29	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Acenaphthylene	208-96-8	10	0.29	ND	ND	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Acenaphthylene	208-96-8		1.17453	ND	ND	ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Acenaphthylene	208-96-8	20	0.58	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Acenaphthylene	208-96-8	11	0.31	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Acenaphthylene	208-96-8		1.17453	2.4029		ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Acenaphthylene	208-96-8	10	0.29	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Acenaphthylene	208-96-8	50	1.5	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Acenaphthylene	208-96-8		1.17453	ND	ND	ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Acenaphthylene	208-96-8	25.8	5.11	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Acenaphthylene	208-96-8	50	9.9	ND	ND	µg/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Acenaphthylene	208-96-8		1.17453	2.424		ng/L	Water	NA	1
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Acenaphthylene	208-96-8	99	19.8	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Acenaphthylene	208-96-8	498	99	ND	ND	ug/L	Water	NA	100
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Acenaphthylene	208-96-8		1.17	7.333		ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Acenaphthylene	208-96-8	2	0.15	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Acenaphthylene	208-96-8	0.5	0.075	ND	ND	ug/L	Water	NA	5
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Acenaphthylene	208-96-8		1.17	6.987		ng/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Acenaphthylene	208-96-8	3.8	0.52	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Acenaphthylene	208-96-8	4	1.1	ND	ND	ug/L	Water	NA	20
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Acenaphthylene	208-96-8		1.17	12.498		ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Acenaphthylene	208-96-8	4.7	1.3	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Acenaphthylene	208-96-8	3.8	1.1	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Acenaphthylene	208-96-8		1.17	11.162		ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Acenaphthylene	208-96-8	20	1.3	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Acenaphthylene	208-96-8	8	0.52	ND	ND	ug/L	Water	NA	10
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Acenaphthylene	208-96-8		1.17	9.779		ng/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Acetaminophen	103-90-2	NA	4.88	122		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Acetaminophen	103-90-2	59.6	NA	67500	D	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Acetone	67-64-1	20	3.1	160		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Acetone	67-64-1	20	3.1	130		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Acetone	67-64-1	20	3.1	190		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Acetone	67-64-1	20	3.1	160		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Acetone	67-64-1	20	3.1	160		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Acetone	67-64-1	20	3.1	300		µg/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Acetone	67-64-1	20	0.01	270		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Acetone	67-64-1	20	0.01	130		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Acetone	67-64-1	20	2	160		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Acetone	67-64-1	20	2	200		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Acetone	67-64-1	20	2	270		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Acetone	67-64-1	20	2	210		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Acetone	67-64-1	20	2	160		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Acetone	67-64-1	20	2	220		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Acrolein	107-02-8	50	3.7	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Acrolein	107-02-8	50	3.7	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Acrolein	107-02-8	50	0.98	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Acrolein	107-02-8	50	0.98	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Acrolein	107-02-8	50	0.98	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Acrolein	107-02-8	50	0.98	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Acrolein	107-02-8	250	140	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Acrolein	107-02-8	50	28	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Acrolein	107-02-8	250	140	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Acrolein	107-02-8	250	140	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Acrolein	107-02-8	50	0.01	1.3	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Acrolein	107-02-8	50	0.01	1	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Acrolein	107-02-8	50	2	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Acrolein	107-02-8	50	2	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Acrolein	107-02-8	50	2	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Acrolein	107-02-8	50	2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Acrolein	107-02-8	50	2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Acrolein	107-02-8	50	2	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Acrylonitrile	107-13-1	10	0.14	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Acrylonitrile	107-13-1	10	0.14	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Acrylonitrile	107-13-1	10	0.12	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Acrylonitrile	107-13-1	10	0.12	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Acrylonitrile	107-13-1	10	0.12	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Acrylonitrile	107-13-1	10	0.12	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Acrylonitrile	107-13-1	50	7.5	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Acrylonitrile	107-13-1	10	1.5	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Acrylonitrile	107-13-1	50	7.5	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Acrylonitrile	107-13-1	50	7.5	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Acrylonitrile	107-13-1	10	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Acrylonitrile	107-13-1	10	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Acrylonitrile	107-13-1	10	0.2	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Acrylonitrile	107-13-1	100	0.2	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Acrylonitrile	107-13-1	10	0.2	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Acrylonitrile	107-13-1	10	0.2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Acrylonitrile	107-13-1	10	0.2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Acrylonitrile	107-13-1	100	0.2	ND	ND	ug/L	Water	NA	1
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	ADONA	2127366-90-7	5.43	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Albuterol	18559-94-9	NA	0.00087	0.0201	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Albuterol	18559-94-9	1.49	NA	14.5	D	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Aldrin	309-00-2	0.011	0.0013	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Aldrin	309-00-2	0.011	0.00081	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Aldrin	309-00-2	0.01	0.0004	0.0097	J,P	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Aldrin	309-00-2	0.011	0.00041	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Aldrin	309-00-2	0.01	0.0021	ND	ND	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Aldrin	309-00-2	0.01	0.0021	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Aldrin	309-00-2	0.1	0.027	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Aldrin	309-00-2	0.1	0.028	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Aldrin	309-00-2	0.02	0.02	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Aldrin	309-00-2	0.025	0.005	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Aldrin	309-00-2	0.056	0.056	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Aldrin	309-00-2	0.0055	0.0055	0.0068		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Aldrin	309-00-2	0.048	0.0077	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Aldrin	309-00-2	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Aldrin	309-00-2	0.092	0.092	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Aldrin	309-00-2	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Aldrin	309-00-2	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Aldrin	309-00-2	0.005	0.005	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Aldrin	309-00-2	NA	2.2E-05		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Allyl Trenbolone		4.5	NA	ND	U	ng/L	Aqueous	NA	NA
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Alpha-BHC	319-84-6	0.1	0.028	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Alpha-BHC	319-84-6	0.1	0.029	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	alpha-Chlordane	5103-71-9	0.013	0.013	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	alpha-Chlordane	5103-71-9	0.021	0.021	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	alpha-Chlordane	5103-71-9	0.017	0.017	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	alpha-Chlordane	5103-71-9	0.011	0.0085	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	alpha-Chlordane	5103-71-9	0.01	0.005	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	alpha-Chlordane	5103-71-9	0.01	0.0028	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	alpha-Chlordane	5103-71-9	0.02	0.02	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	alpha-Chlordane	5103-71-9	0.025	0.0043	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	alpha-Chlordane	5103-71-9	0.0055	0.0055	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	alpha-Chlordane	5103-71-9	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	alpha-Chlordane	5103-71-9	0.048	0.0036	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	alpha-Chlordane	5103-71-9	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	alpha-Chlordane	5103-71-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	alpha-Chlordane	5103-71-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	alpha-Chlordane	5103-71-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	alpha-Chlordane	5103-71-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	SGS AXYS - Canada	NA	A23-RET-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-070 Rev	NA	HBCDD	alpha-HBCDD	134237-50-6	1.03	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Alprazolam	28981-97-7	NA	0.00069	0.0032		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Alprazolam	28981-97-7	0.298	NA	0.871		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Ametryn	834-12-8	NA	0.00116		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Amitriptyline	50-48-6	NA	0.0016	0.0746	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Amitriptyline	50-48-6	0.298	NA	29.4		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Amlodipine	88150-42-9	NA	0.00991	0.0248	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Amlodipine	88150-42-9	0.999	NA	18.8		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Amphetamine	300-62-9	NA	0.00743	0.304	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Amphetamine	300-62-9	2.52	NA	539	D	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Androstenedione	63-05-8	1.43	NA	162		ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Androsterone	53-41-8	24.7	NA	57.1		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Anhydrochlortetracycline [ACTC]	948758	NA	0.119		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Anhydrotetracycline [ATC]	4496-85-9	NA	0.049		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Anthracene	120-12-7	10	0.33	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Anthracene	120-12-7	10	0.33	ND	ND	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Anthracene	120-12-7		0.76728	43.288		ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Anthracene	120-12-7	20	0.66	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Anthracene	120-12-7	11	0.36	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Anthracene	120-12-7		0.76728	28.282		ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Anthracene	120-12-7	10	0.33	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Anthracene	120-12-7	50	1.7	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Anthracene	120-12-7		0.76728	39.813		ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Anthracene	120-12-7	25.8	8.25	ND	ND	µg/L	Water	NA	5

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Anthracene	120-12-7	50	16	ND	ND	µg/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Anthracene	120-12-7		0.76728	55.302		ng/L	Water	NA	1
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Anthracene	120-12-7	99	32	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Anthracene	120-12-7	498	160	ND	ND	ug/L	Water	NA	100
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Anthracene	120-12-7		0.77	20.215		ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Anthracene	120-12-7	2	0.24	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Anthracene	120-12-7	0.5	0.12	ND	ND	ug/L	Water	NA	5
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Anthracene	120-12-7		0.77	47.191		ng/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Anthracene	120-12-7	3.8	1.2	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Anthracene	120-12-7	4	2.3	ND	ND	ug/L	Water	NA	20
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Anthracene	120-12-7		0.77	45.632		ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Anthracene	120-12-7	4.7	2.8	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Anthracene	120-12-7	3.8	2.3	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Anthracene	120-12-7		0.77	28.812		ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Anthracene	120-12-7	20	2.8	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Anthracene	120-12-7	8	1.2	ND	ND	ug/L	Water	NA	10
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Anthracene	120-12-7		0.77	33.928		ng/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-008	M19D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.612		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-013	M19D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.661		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-023	M19D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.575		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-003	M19W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.657		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-008	M19W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.713		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-018	M19W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.634		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-003	M20D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.655		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-018	M20D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.643		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-028	M20D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.568		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-003	M20W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.644		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-013	M20W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.735		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-023	M20W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.74		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-008	M21D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.641		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-016	M21D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.578		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-024	M21D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.683		ug/L	Water	NA	1
2021	ALS Environmental - WA	KQ2114726-07	M21W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	Lab Dup	7/26/2021	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.632		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-016	M21W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.712		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-024	M21W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.702		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-008	M22D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.651		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-016	M22D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.617		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-024	M22D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.609		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-008	M22W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.785		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-016	M22W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.651		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-024	M22W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.551		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-04	M23D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/21/2023	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.809		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-004	M23D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.735		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-006	M23D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.904		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-008	M23W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.652		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-016	M23W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.745		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-024	M23W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.904		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-006	MOA15TML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.53		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-018	MOA15TML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.56		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-002	MOA15TML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.6		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-007	MOA15TML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.7		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-003	MOA15TML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.01	0.601		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-013	MOA15TML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.01	0.624		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-006	MOA16TML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.01	0.574		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-002	MOA16TML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.01	0.651		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-012	MOA16TML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.01	0.593		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-006	MOA16TML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.006	0.713		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2016	ALS Environmental - WA	K1609312-002	MOA16TML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.006	0.602		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-002	MOA16TML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.006	0.539		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-002	MOA17TML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.006	0.731		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-002	MOA17TML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.006	0.643		µg/L	Water	NA	1
2017	ALS Environmental - WA	KQ1707755-03	MOA17TML006	SummerDry	Effluent	Final Effluent	Lab Dup	06/09/2017	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.006	0.64		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-008	MOA17TML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.006	0.675		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-041	MOA17TML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.006	0.58		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-051	MOA17TML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.006	0.621		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-004	MOA18TML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.7		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-014	MOA18TML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.654		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-024	MOA18TML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.547		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-004	MOA18TML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.678		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-014	MOA18TML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.802		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-024	MOA18TML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Total	Metals	Antimony	7440-36-0	0.05	0.02	0.663		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8082A		PCBs	Aroclor 1016	12674-11-2	0.21	0.043	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8082A		PCBs	Aroclor 1016	12674-11-2	0.21	0.034	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8082A		PCBs	Aroclor 1016	12674-11-2	0.2	0.12	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8082A		PCBs	Aroclor 1016	12674-11-2	0.21	0.0096	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8082A		PCBs	Aroclor 1016	12674-11-2	0.19	0.028	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8082A		PCBs	Aroclor 1016	12674-11-2	0.19	0.028	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-6	MOA18PCB002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8082		PCBs	Aroclor 1016	12674-11-2	0.53	0.15	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-6	MOA18PCB005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8082		PCBs	Aroclor 1016	12674-11-2	0.48	0.033	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-004	M19D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8082A		PCBs	Aroclor 1016	12674-11-2	0.2	0.2	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-004	M19W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8082A		PCBs	Aroclor 1016	12674-11-2	2.1	2.1	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-010	M20D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		PCBs	Aroclor 1016	12674-11-2	0.11	0.11	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-010	M20W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		PCBs	Aroclor 1016	12674-11-2	0.16	0.16	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-008	M21D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		PCBs	Aroclor 1016	12674-11-2	0.3	0.3	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-008	M21W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		PCBs	Aroclor 1016	12674-11-2	0.1	0.019	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-006	M22D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		PCBs	Aroclor 1016	12674-11-2	0.1	0.019	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-006	M22W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		PCBs	Aroclor 1016	12674-11-2	0.1	0.019	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-006	M23W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		PCBs	Aroclor 1016	12674-11-2	0.24	0.045	ND	ND,H	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-006	M23D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		PCBs	Aroclor 1016	12674-11-2	0.24	0.046	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8082A		PCBs	Aroclor 1221	11104-28-2	0.42	0.11	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8082A		PCBs	Aroclor 1221	11104-28-2	0.41	0.36	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8082A		PCBs	Aroclor 1221	11104-28-2	1.1	1.1	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8082A		PCBs	Aroclor 1221	11104-28-2	0.41	0.0096	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8082A		PCBs	Aroclor 1221	11104-28-2	0.38	0.028	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8082A		PCBs	Aroclor 1221	11104-28-2	0.37	0.028	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-6	MOA18PCB002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8082		PCBs	Aroclor 1221	11104-28-2	0.53	0.15	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-6	MOA18PCB005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8082		PCBs	Aroclor 1221	11104-28-2	0.48	0.18	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-004	M19D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8082A		PCBs	Aroclor 1221	11104-28-2	0.39	0.39	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-004	M19W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8082A		PCBs	Aroclor 1221	11104-28-2	4.2	4.2	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-010	M20D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		PCBs	Aroclor 1221	11104-28-2	0.4	0.4	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-010	M20W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		PCBs	Aroclor 1221	11104-28-2	0.24	0.24	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-008	M21D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		PCBs	Aroclor 1221	11104-28-2	0.097	0.019	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-008	M21W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		PCBs	Aroclor 1221	11104-28-2	0.1	0.019	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-006	M22D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		PCBs	Aroclor 1221	11104-28-2	0.1	0.019	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-006	M22W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		PCBs	Aroclor 1221	11104-28-2	0.1	0.019	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-006	M23W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		PCBs	Aroclor 1221	11104-28-2	0.24	0.045	ND	ND,H	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-006	M23D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		PCBs	Aroclor 1221	11104-28-2	0.24	0.046	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8082A		PCBs	Aroclor 1232	11141-16-5	0.42	0.42	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8082A		PCBs	Aroclor 1232	11141-16-5	0.21	0.047	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8082A		PCBs	Aroclor 1232	11141-16-5	0.21	0.21	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8082A		PCBs	Aroclor 1232	11141-16-5	0.21	0.0096	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8082A		PCBs	Aroclor 1232	11141-16-5	0.19	0.028	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8082A		PCBs	Aroclor 1232	11141-16-5	0.19	0.028	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-6	MOA18PCB002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8082		PCBs	Aroclor 1232	11141-16-5	0.53	0.13	ND	ND	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2018	Eurofins Calscience, Inc.	18-08-1834-6	MOA18PCB005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8082		PCBs	Aroclor 1232	11141-16-5	0.48	0.056	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-004	M19D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8082A		PCBs	Aroclor 1232	11141-16-5	0.42	0.42	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-004	M19W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8082A		PCBs	Aroclor 1232	11141-16-5	2.1	2.1	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-010	M20D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		PCBs	Aroclor 1232	11141-16-5	0.061	0.061	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-010	M20W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		PCBs	Aroclor 1232	11141-16-5	0.35	0.35	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-008	M21D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		PCBs	Aroclor 1232	11141-16-5	0.097	0.019	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-008	M21W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		PCBs	Aroclor 1232	11141-16-5	0.1	0.019	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-006	M22D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		PCBs	Aroclor 1232	11141-16-5	0.1	0.019	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-006	M22W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		PCBs	Aroclor 1232	11141-16-5	0.1	0.019	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-006	M23W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		PCBs	Aroclor 1232	11141-16-5	0.24	0.045	ND	ND,H	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-006	M23D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		PCBs	Aroclor 1232	11141-16-5	0.24	0.046	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8082A		PCBs	Aroclor 1242	53469-21-9	0.42	0.42	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8082A		PCBs	Aroclor 1242	53469-21-9	0.21	0.11	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8082A		PCBs	Aroclor 1242	53469-21-9	0.2	0.12	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8082A		PCBs	Aroclor 1242	53469-21-9	0.21	0.0096	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8082A		PCBs	Aroclor 1242	53469-21-9	0.19	0.028	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8082A		PCBs	Aroclor 1242	53469-21-9	0.19	0.028	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-6	MOA18PCB002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8082		PCBs	Aroclor 1242	53469-21-9	0.53	0.066	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-6	MOA18PCB005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8082		PCBs	Aroclor 1242	53469-21-9	0.48	0.045	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-004	M19D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8082A		PCBs	Aroclor 1242	53469-21-9	0.2	0.2	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-004	M19W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8082A		PCBs	Aroclor 1242	53469-21-9	2.1	2.1	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-010	M20D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		PCBs	Aroclor 1242	53469-21-9	0.11	0.11	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-010	M20W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		PCBs	Aroclor 1242	53469-21-9	0.19	0.19	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-008	M21D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		PCBs	Aroclor 1242	53469-21-9	0.097	0.019	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-008	M21W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		PCBs	Aroclor 1242	53469-21-9	0.1	0.019	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-006	M22D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		PCBs	Aroclor 1242	53469-21-9	0.1	0.019	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-006	M22W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		PCBs	Aroclor 1242	53469-21-9	0.1	0.019	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-006	M23W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		PCBs	Aroclor 1242	53469-21-9	0.24	0.045	ND	ND,H	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-006	M23D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		PCBs	Aroclor 1242	53469-21-9	0.24	0.046	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8082A		PCBs	Aroclor 1248	12672-29-6	0.21	0.17	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8082A		PCBs	Aroclor 1248	12672-29-6	0.21	0.037	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8082A		PCBs	Aroclor 1248	12672-29-6	0.2	0.18	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8082A		PCBs	Aroclor 1248	12672-29-6	0.21	0.0096	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8082A		PCBs	Aroclor 1248	12672-29-6	0.19	0.028	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8082A		PCBs	Aroclor 1248	12672-29-6	0.19	0.028	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-6	MOA18PCB002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8082		PCBs	Aroclor 1248	12672-29-6	0.53	0.11	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-6	MOA18PCB005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8082		PCBs	Aroclor 1248	12672-29-6	0.48	0.052	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-004	M19D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8082A		PCBs	Aroclor 1248	12672-29-6	0.2	0.2	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-004	M19W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8082A		PCBs	Aroclor 1248	12672-29-6	2.1	2.1	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-010	M20D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		PCBs	Aroclor 1248	12672-29-6	0.051	0.051	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-010	M20W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		PCBs	Aroclor 1248	12672-29-6	0.19	0.19	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-008	M21D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		PCBs	Aroclor 1248	12672-29-6	0.097	0.019	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-008	M21W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		PCBs	Aroclor 1248	12672-29-6	0.1	0.019	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-006	M22D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		PCBs	Aroclor 1248	12672-29-6	0.1	0.019	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-006	M22W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		PCBs	Aroclor 1248	12672-29-6	0.1	0.019	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-006	M23W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		PCBs	Aroclor 1248	12672-29-6	0.24	0.045	ND	ND,H	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-006	M23D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		PCBs	Aroclor 1248	12672-29-6	0.24	0.046	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8082A		PCBs	Aroclor 1254	11097-69-1	0.21	0.2	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8082A		PCBs	Aroclor 1254	11097-69-1	0.21	0.018	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8082A		PCBs	Aroclor 1254	11097-69-1	0.2	0.086	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8082A		PCBs	Aroclor 1254	11097-69-1	0.21	0.0096	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8082A		PCBs	Aroclor 1254	11097-69-1	0.19	0.028	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8082A		PCBs	Aroclor 1254	11097-69-1	0.19	0.028	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-6	MOA18PCB002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8082		PCBs	Aroclor 1254	11097-69-1	0.53	0.12	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-6	MOA18PCB005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8082		PCBs	Aroclor 1254	11097-69-1	0.48	0.086	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-004	M19D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8082A		PCBs	Aroclor 1254	11097-69-1	0.2	0.2	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-004	M19W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8082A		PCBs	Aroclor 1254	11097-69-1	2.1	2.1	ND	ND	ug/L	Water	NA	10

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2020	ALS Environmental - WA	K2005324-010	M20D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		PCBs	Aroclor 1254	11097-69-1	0.028	0.028	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-010	M20W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		PCBs	Aroclor 1254	11097-69-1	0.024	0.024	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-008	M21D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		PCBs	Aroclor 1254	11097-69-1	0.097	0.024	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-008	M21W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		PCBs	Aroclor 1254	11097-69-1	0.1	0.024	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-006	M22D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		PCBs	Aroclor 1254	11097-69-1	0.1	0.024	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-006	M22W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		PCBs	Aroclor 1254	11097-69-1	0.1	0.024	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-006	M23W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		PCBs	Aroclor 1254	11097-69-1	0.24	0.057	ND	ND,H	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-006	M23D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		PCBs	Aroclor 1254	11097-69-1	0.24	0.058	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8082A		PCBs	Aroclor 1260	11096-82-5	0.21	0.032	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8082A		PCBs	Aroclor 1260	11096-82-5	0.21	0.03	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8082A		PCBs	Aroclor 1260	11096-82-5	0.2	0.1	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8082A		PCBs	Aroclor 1260	11096-82-5	0.21	0.0096	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8082A		PCBs	Aroclor 1260	11096-82-5	0.19	0.028	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8082A		PCBs	Aroclor 1260	11096-82-5	0.19	0.028	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-6	MOA18PCB002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8082		PCBs	Aroclor 1260	11096-82-5	0.53	0.14	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-6	MOA18PCB005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8082		PCBs	Aroclor 1260	11096-82-5	0.48	0.036	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-004	M19D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8082A		PCBs	Aroclor 1260	11096-82-5	0.2	0.2	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-004	M19W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8082A		PCBs	Aroclor 1260	11096-82-5	2.1	2.1	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2006868-010	M20W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		PCBs	Aroclor 1260	11096-82-5	0.038	0.038	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-010	M20D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		PCBs	Aroclor 1260	11096-82-5	0.022	0.022	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-008	M21D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		PCBs	Aroclor 1260	11096-82-5	0.097	0.024	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-008	M21W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		PCBs	Aroclor 1260	11096-82-5	0.1	0.024	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-006	M22D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		PCBs	Aroclor 1260	11096-82-5	0.1	0.024	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-006	M22W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		PCBs	Aroclor 1260	11096-82-5	0.1	0.024	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-006	M23W-PCB-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		PCBs	Aroclor 1260	11096-82-5	0.24	0.057	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-006	M23D-PCB-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		PCBs	Aroclor 1260	11096-82-5	0.24	0.058	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	KQ1908740-03	M19D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/19/2019	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.63		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-013	M19D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.83		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-023	M19D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.52		ug/L	Water	NA	1
2019	Brooks Applied Labs	B191820-DUP2	M19R-MTT-EF	RecWater	Effluent	Final Effluent	Lab Dup	06/18/2019	EPA 1640 RP	Total	Metals	Arsenic	7440-38-2	0.1	0.034	1.24	J-	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-003	M19W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	3.32		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-008	M19W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.95		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-018	M19W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	3.12		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-003	M20D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.54		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-018	M20D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.56		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-028	M20D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.33		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-02RE2	M20R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Total	Metals	Arsenic	7440-38-2	0.2	0.088	1.26		ug/L	Water	NA	2
2020	ALS Environmental - WA	KQ2011526-03	M20W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	Lab Dup	8/10/2020	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.61		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-013	M20W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.89		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-023	M20W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.53		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-008	M21D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.44		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-016	M21D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.35		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-024	M21D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.43		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-18	M21R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Total	Metals	Arsenic	7440-38-2	0.1	0.044	1.21		ug/L	Water	NA	1
2021	ALS Environmental - WA	KQ2114726-07	M21W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	Lab Dup	7/26/2021	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.42		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-016	M21W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.6		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-024	M21W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.74		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-008	M22D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.51		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-016	M22D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.27		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-024	M22D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.46		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-32	M22R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Total	Metals	Arsenic	7440-38-2	0.72	0.16	2.13		ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209249-008	M22W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	3.22		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-016	M22W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	3.05		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-024	M22W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.89		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-002	M23D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.33		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-06	M23D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	Lab Dup	6/22/2023	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.34		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-006	M23D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.23		ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	Brooks Applied Labs	2306399-18	M23R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1638M	Total	Metals	Arsenic	7440-38-2	0.721	0.16	2.11		ug/L	Water	NA	10
2023	ALS Environmental - WA	K2309291-008	M23W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.31		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-016	M23W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.73		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-024	M23W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	3.42		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-006	MOA15TML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.08	2.27		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-018	MOA15TML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.08	2.29		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-002	MOA15TML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.08	2.53		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-007	MOA15TML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.08	2.58		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-003	MOA15TML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.05	2.25		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-013	MOA15TML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.05	2.43		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-006	MOA16TML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.05	2.84		µg/L	Water	NA	1
2016	ALS Environmental - WA	KQ1608088-05	MOA16TML004	SummerDry	Effluent	Final Effluent	Lab Dup	06/23/2016	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.05	2.7		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-012	MOA16TML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.05	2.93		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-006	MOA16TML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.2	2.93		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-002	MOA16TML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.2	3.21		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-002	MOA16TML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.2	2.94		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-22	MOA16TMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Total	Metals	Arsenic	7440-38-2	0.1	0.034	0.962		µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-17	MOA17DMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Total	Metals	Arsenic	7440-38-2	0.1	0.034	1.11		µg/L	Water	NA	1
2017	ALS Environmental - WA	KQ1707755-05	MOA17TML002	SummerDry	Effluent	Final Effluent	Lab Dup	06/07/2017	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.2	2.5		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-002	MOA17TML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.2	2.36		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-002	MOA17TML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.2	2.57		µg/L	Water	NA	1
2017	ALS Environmental - WA	KQ1711770-05	MOA17TML008	SummerWet	Effluent	Final Effluent	Lab Dup	08/08/2017	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.2	2.43		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-041	MOA17TML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.2	2.46		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-051	MOA17TML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.2	2.43		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-004	MOA18TML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.72		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-014	MOA18TML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.78		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-024	MOA18TML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.09	2.56		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-004	MOA18TML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.08	2.62		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-014	MOA18TML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.08	2.63		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-024	MOA18TML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Total	Metals	Arsenic	7440-38-2	0.5	0.08	2.84		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-16RE1	MOA18TMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Total	Metals	Arsenic	7440-38-2	0.1	0.034	1.14		µg/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Atenolol	29122-68-7	NA	0.00572	1.88	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Atenolol	29122-68-7	1.49	NA	381	D	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Atorvastatin	134523-00-5	NA	0.00447	0.0604	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Atorvastatin	134523-00-5	5.97	NA	220	D	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Atrazine	1912-24-9	NA	0.00284		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Azinphos-Methyl	86-50-0	NA	0.0097		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8141B		Pesticides	Azinphos-methyl (Guthion)	86-50-0	1.1	0.078	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8141B		Pesticides	Azinphos-methyl (Guthion)	86-50-0	1.1	0.054	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8141B		Pesticides	Azinphos-methyl (Guthion)	86-50-0	2	0.78	ND	ND	µg/L	Water	NA	2
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8141B		Pesticides	Azinphos-methyl (Guthion)	86-50-0	1.1	0.026	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8141B		Pesticides	Azinphos-methyl (Guthion)	86-50-0	1.1	0.13	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8141B		Pesticides	Azinphos-methyl (Guthion)	86-50-0	1.1	0.16	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-4	MOA18POP002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8141A		Pesticides	Azinphos-methyl (Guthion)	86-50-0	5.3	3.0	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-4	MOA18POP005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8141A		Pesticides	Azinphos-methyl (Guthion)	86-50-0	5.0	2.9	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1908294-003	M19W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	ALS SOP		Pesticides	Azinphos-methyl (Guthion)	86-50-0	0.1	0.018	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-003	M19D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	ALS SOP		Pesticides	Azinphos-methyl (Guthion)	86-50-0	0.1		ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-009	M20D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	ALS SOP		Pesticides	Azinphos-methyl (Guthion)	86-50-0	0.11	0.019	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-009	M20W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	ALS SOP		Pesticides	Azinphos-methyl (Guthion)	86-50-0	0.1	0.018	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-006	M21W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	ALS SOP		Pesticides	Azinphos-methyl (Guthion)	86-50-0	0.097	0.018	ND	ND,H	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-006	M21D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	ALS SOP		Pesticides	Azinphos-methyl (Guthion)	86-50-0	0.47	0.09	ND	ND	ug/L	Water	NA	5
2022	ALS Environmental - WA	K2206847-004	M22D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	ALS SOP		Pesticides	Azinphos-methyl (Guthion)	86-50-0	0.1	0.018	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-004	M22W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	ALS SOP		Pesticides	Azinphos-methyl (Guthion)	86-50-0	0.096	0.018	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-004	M23D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	ALS SOP		Pesticides	Azinphos-methyl (Guthion)	86-50-0	0.1	0.018	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-004	M23W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	ALS SOP		Pesticides	Azinphos-methyl (Guthion)	86-50-0	0.097	0.018	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Azithromycin	83905-01-5	NA	0.00144	0.112		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Azithromycin	83905-01-5	6.13	NA	341		ng/L	Aqueous	NA	NA

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Benz(a)anthracene	56-55-3	10	0.25	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Benz(a)anthracene	56-55-3	10	0.25	ND	ND	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Benz(a)anthracene	56-55-3		0.73672	45.708		ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Benz(a)anthracene	56-55-3	20	0.5	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Benz(a)anthracene	56-55-3	11	0.27	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Benz(a)anthracene	56-55-3		0.73672	22.41		ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Benz(a)anthracene	56-55-3	10	0.25	0.25	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Benz(a)anthracene	56-55-3	50	1.3	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Benz(a)anthracene	56-55-3		0.73672	55.319		ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Benz(a)anthracene	56-55-3	25.8	5.16	ND	ND	µg/L	Water	NA	5
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Benz(a)anthracene	56-55-3		0.73672	56.76		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benz(a)anthracene	56-55-3		0.74	34.501		ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Benz(a)anthracene	56-55-3	2	0.18	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Benz(a)anthracene	56-55-3	0.5	0.09	ND	ND	ug/L	Water	NA	5
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benz(a)anthracene	56-55-3		0.74	46.564		ng/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Benz(a)anthracene	56-55-3	3.8	0.6	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Benz(a)anthracene	56-55-3	4	1.2	ND	ND	ug/L	Water	NA	20
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benz(a)anthracene	56-55-3		0.74	42.414		ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Benz(a)anthracene	56-55-3	4.7	1.5	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Benz(a)anthracene	56-55-3	3.8	1.2	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benz(a)anthracene	56-55-3		0.74	23.171		ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Benz(a)anthracene	56-55-3	20	1.5	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Benz(a)anthracene	56-55-3	8	0.6	ND	ND	ug/L	Water	NA	10
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benz(a)anthracene	56-55-3		0.74	29.667		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Benzene	71-43-2	0.5	0.031	0.13	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506653-001	MOA15VOA008	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	624		VOCs	Benzene	71-43-2	0.5	0.031	0.1	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Benzene	71-43-2	0.5	0.031	0.67		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607039-001	MOA16VOA008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	624		VOCs	Benzene	71-43-2	0.5	0.031	0.15	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Benzene	71-43-2	0.5	0.031	0.13	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Benzene	71-43-2	0.5	0.031	0.11	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Benzene	71-43-2	0.5	0.031	0.11	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1706002-001	MOA17VOA008	RecWater	Effluent	Final Effluent	SAMP	06/06/2017	624		VOCs	Benzene	71-43-2	0.5	0.031	0.08	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Benzene	71-43-2	0.5	0.031	0.28	J	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Benzene	71-43-2	5	1.05	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Benzene	71-43-2	1	0.21	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806164-001	MOA18VOA008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 624		VOCs	Benzene	71-43-2	0.5	0.031	0.78		µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Benzene	71-43-2	5	1.05	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Benzene	71-43-2	5	1.05	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	K1905864-001	M19R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	EPA 624		VOCs	Benzene	71-43-2	0.5	0.031	0.16	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005387-010	M20R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	624.1		VOCs	Benzene	71-43-2	0.5	0.01	0.14	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Benzene	71-43-2	0.5	0.01	0.17	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Benzene	71-43-2	0.5	0.01	0.04	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106804-001	M21R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Benzene	71-43-2	0.5	0.06	0.06	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Benzene	71-43-2	0.5	0.06	0.06	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Benzene	71-43-2	5	0.06	0.08	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Benzene	71-43-2	0.5	0.06	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Benzene	71-43-2	0.5	0.06	0.31	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Benzene	71-43-2	0.5	0.06	0.07	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Benzene	71-43-2	5	0.06	0.27	J	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Benzidine	92-87-5	50	29	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Benzidine	92-87-5	50	29	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Benzidine	92-87-5	100	58	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Benzidine	92-87-5	54	31	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Benzidine	92-87-5	50	29	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Benzidine	92-87-5	250	150	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Benzidine	92-87-5	103	15	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Benzidine	92-87-5	20	20	ND	ND	ug/L	Water	NA	5

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Benzidine	92-87-5	10	10	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Benzidine	92-87-5	19	19	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Benzidine	92-87-5	37	37	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Benzidine	92-87-5	46	46	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Benzidine	92-87-5	37	37	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Benzidine	92-87-5	50	46	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Benzidine	92-87-5	20	19	ND	ND	ug/L	Water	NA	10
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2		2.5108	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2		2.5108	2.1744	J	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2		2.5108	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2		2.5108	12.589		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2		2.51	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2		2.51	10.141		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2		2.51	6.117		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2		2.51	5.596		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(a)fluoranthene	205-99-2		2.51	15.086		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	10	0.37	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	10	0.37	ND	ND	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Benzo(a)pyrene	50-32-8		1.91293	22.313		ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	20	0.74	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	11	0.4	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Benzo(a)pyrene	50-32-8		1.91293	19.812		ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	10	0.37	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	50	1.9	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Benzo(a)pyrene	50-32-8		1.91293	29.526		ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	25.8	6.19	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	50	12	ND	ND	µg/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Benzo(a)pyrene	50-32-8		1.91293	56.26		ng/L	Water	NA	1
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	99	24	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	498	120	ND	ND	ug/L	Water	NA	100
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(a)pyrene	50-32-8		1.91	17.907		ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	2	0.31	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	0.5	0.16	ND	ND	ug/L	Water	NA	5
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(a)pyrene	50-32-8		1.91	33.736		ng/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	3.8	0.64	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	4	1.3	ND	ND	ug/L	Water	NA	20
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(a)pyrene	50-32-8		1.91	15.104		ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	4.7	1.6	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	3.8	1.3	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(a)pyrene	50-32-8		1.91	9.124		ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	20	1.6	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Benzo(a)pyrene	50-32-8	8	0.64	ND	ND	ug/L	Water	NA	10
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(a)pyrene	50-32-8		1.91	11.768		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	10	0.27	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	10	0.27	ND	ND	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2		2.38234	30.685		ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	20	0.54	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	11	0.29	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2		2.38234	23.584		ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	10	0.27	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	50	1.4	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2		2.38234	49.04		ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	25.8	5.16	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	50	10	ND	ND	µg/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2		2.38234	46.142		ng/L	Water	NA	1
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	99	20	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	498	100	ND	ND	ug/L	Water	NA	100

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2		2.38	16.027		ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	2	0.17	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	0.5	0.085	ND	ND	ug/L	Water	NA	5
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2		2.38	17.738		ng/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	3.8	0.55	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	4	1.1	ND	ND	ug/L	Water	NA	20
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2		2.38	17.243		ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	4.7	1.4	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	3.8	1.1	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2		2.38	10.884		ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	20	1.4	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2	8	0.55	ND	ND	ug/L	Water	NA	10
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(b)fluoranthene	205-99-2		2.38	13.635		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Benzo(b)fluorene	243-17-4		1.37261	31.032		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Benzo(b)fluorene	243-17-4		1.37261	17.269		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Benzo(b)fluorene	243-17-4		1.37261	23.283		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Benzo(b)fluorene	243-17-4		1.37261	40.606		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(b)fluorene	243-17-4		1.37	14.537		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(b)fluorene	243-17-4		1.37	15.37		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(b)fluorene	243-17-4		1.37	13.806		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(b)fluorene	243-17-4		1.37	10.196		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(b)fluorene	243-17-4		1.37	12.803		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Benzo(e)pyrene	50-32-8		2.69264	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Benzo(e)pyrene	50-32-8		2.69264	12.966		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Benzo(e)pyrene	50-32-8		2.69264	20.409	J	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Benzo(e)pyrene	50-32-8		2.69264	31.93		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(e)pyrene	50-32-8		2.69	21.865		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(e)pyrene	50-32-8		2.69	11.715		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(e)pyrene	50-32-8		2.69	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(e)pyrene	50-32-8		2.69	26.113		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(e)pyrene	50-32-8		2.69	52.348		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	10	0.41	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	10	0.41	ND	ND	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2		2.50879	12.016		ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	20	0.82	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	11	0.44	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2		2.50879	5.8977		ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	10	0.41	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	50	2.1	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2		2.50879	ND	ND	ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	25.8	7.22	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	50	14	ND	ND	µg/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2		2.50879	83.279		ng/L	Water	NA	1
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	99	28	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	498	140	ND	ND	ug/L	Water	NA	100
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2		2.51	25.155		ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	2	0.19	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	0.5	0.095	ND	ND	ug/L	Water	NA	5
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2		2.51	40.776		ng/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	3.8	1.4	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	4	2.8	ND	ND	ug/L	Water	NA	20
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2		2.51	ND	ND	ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	4.7	3.5	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	3.8	2.8	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2		2.51	ND	ND	ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	20	3.5	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2	8	1.4	ND	ND	ug/L	Water	NA	10

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(g,h,i)perylene	191-24-2		2.51	ND	ND	ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	10	0.32	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	10	0.32	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	20	0.64	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	11	0.35	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	10	0.32	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	50	1.6	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	25.8	9.28	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	50	18	ND	ND	µg/L	Water	NA	10
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	99	36	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	498	180	ND	ND	ug/L	Water	NA	100
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	2	0.24	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	0.5	0.12	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	3.8	0.8	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	4	1.6	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	4.7	2	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	3.8	1.6	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	20	2	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Benzo(k)fluoranthene	207-08-9	8	0.8	ND	ND	ug/L	Water	NA	10
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9		2.5108	24.119		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9		2.5108	7.8265		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9		2.5108	11.758	J	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9		2.5108	33.366		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9		2.51	14.504		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9		2.51	14.765		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9		2.51	16.138		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9		2.51	10.274		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzo(k,j)fluoranthene	207-08-9		2.51	14.911		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Benzothiophene	95-15-8		1.28601	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Benzothiophene	95-15-8		1.28601	2.8759		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Benzothiophene	95-15-8		1.28601	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Benzothiophene	95-15-8		1.28601	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzothiophene	95-15-8		1.29	5.827		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzothiophene	95-15-8		1.29	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzothiophene	95-15-8		1.29	14.421		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzothiophene	95-15-8		1.29	5.458		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Benzothiophene	95-15-8		1.29	ND	ND	ng/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Benzoylecgonine	519-09-5	NA	0.0009	1.96		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Benzoylecgonine	519-09-5	1.49	NA	1920	D	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Benztropine	86-13-5	NA	0.00086	0.0011	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Benztropine	86-13-5	0.695	NA	ND	U	ng/L	Aqueous	NA	NA
2019	ALS Environmental - WA	KQ1908740-03	M19D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/19/2019	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	0.005	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-013	M19D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-023	M19D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-003	M19W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	0.017	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-008	M19W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	0.018	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-018	M19W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	0.011	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-003	M20D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-018	M20D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-028	M20D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	KQ2011526-03	M20W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	Lab Dup	8/10/2020	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	0.014	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-013	M20W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	0.008	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-023	M20W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	0.011	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-008	M21D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-016	M21D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-024	M21D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-008	M21W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2021	ALS Environmental - WA	K2108796-016	M21W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-024	M21W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-008	M22D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	0.006	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-016	M22D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-024	M22D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	KQ2213818-05	M22W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	Lab Dup	8/8/2022	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	0.013	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-016	M22W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	0.01	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-024	M22W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	0.008	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-002	M23D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-004	M23D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-006	M23D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-008	M23W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-016	M23W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	0.009	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-024	M23W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	0.01	J	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-006DUP	MOA15TML002	SummerDry	Effluent	Final Effluent	Lab Dup	06/16/2015	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.002	0.004	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-018	MOA15TML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.002	0.004	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-002	MOA15TML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.002	0.005	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-007	MOA15TML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.002	0.006	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-003	MOA15TML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.008	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-013	MOA15TML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.008	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-006	MOA16TML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.008	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-002	MOA16TML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.008	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-012	MOA16TML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.008	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-006	MOA16TML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.006	0.014	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-002	MOA16TML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.006	0.008	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-002	MOA16TML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	KQ1707755-05	MOA17TML002	SummerDry	Effluent	Final Effluent	Lab Dup	06/07/2017	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.006	0.006	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-002	MOA17TML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-002	MOA17TML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-008	MOA17TML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-041	MOA17TML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-051	MOA17TML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-004	MOA18TML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-014	MOA18TML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-024	MOA18TML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-004	MOA18TML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.002	0.004	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-014	MOA18TML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.002	0.008	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-024	MOA18TML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Total	Metals	Beryllium	7440-41-7	0.02	0.002	0.006	J	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Beta-BHC	319-85-7	0.1	0.03	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Beta-BHC	319-85-7	0.1	0.031	ND	ND	µg/L	Water	NA	1
2023	SGS AXYS - Canada	NA	A23-RET-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-070 Rev	NA	HBCDD	beta-HBCDD	134237-51-7	1.03	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Betamethasone	378-44-9	NA	0.0045		U D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Betamethasone	378-44-9	1.49	NA	ND	U	ng/L	Aqueous	NA	NA
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Biphenyl	92-52-4		5.0888	41.004		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Biphenyl	92-52-4		5.0888	22.978		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Biphenyl	92-52-4		5.0888	23.697	J	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Biphenyl	92-52-4		5.0888	38.476		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Biphenyl	92-52-4		5.09	30.555		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Biphenyl	92-52-4		5.09	38.331		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Biphenyl	92-52-4		5.09	94.533		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Biphenyl	92-52-4		5.09	35.976		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Biphenyl	92-52-4		5.09	102.12		ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Bis(1-chloroisopropyl) Ether	108-60-1	2	0.26	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Bis(1-chloroisopropyl) Ether	108-60-1	0.5	0.13	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Bis(1-chloroisopropyl) Ether	108-60-1	3.8	0.46	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Bis(1-chloroisopropyl) Ether	108-60-1	4	0.92	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Bis(1-chloroisopropyl) Ether	108-60-1	4.7	1.2	ND	ND	ug/L	Water	NA	25

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Bis(1-chloroisopropyl) Ether	108-60-1	3.8	0.92	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Bis(1-chloroisopropyl) Ether	108-60-1	20	1.2	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Bis(1-chloroisopropyl) Ether	108-60-1	8	0.46	ND	ND	ug/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	10	0.31	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	10	0.31	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	20	0.62	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	11	0.33	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	10	0.31	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	50	1.6	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	25.8	6.19	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	2	0.24	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	0.5	0.12	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	3.8	0.52	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	4	1.1	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	4.7	1.3	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	3.8	1.1	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	20	1.3	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Bis(2-chloroethoxy)methane	111-91-1	8	0.52	ND	ND	ug/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	10	0.37	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	10	0.37	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	20	0.74	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	11	0.4	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	10	0.37	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	50	1.9	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	25.8	9.8	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	1	0.18	ND	ND	UG/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	0.5	0.18	ND	ND	UG/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	3.8	0.66	ND	ND	UG/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/28/2021	625.1		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	4	1.4	ND	ND	UG/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	4.7	1.7	ND	ND	UG/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	3.8	1.4	ND	ND	UG/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	20	1.7	ND	ND	UG/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Bis(2-chloroethyl) Ether	111-44-4	8	0.66	ND	ND	UG/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Bis(2-chloroisopropyl) Ether	108-60-1	10	0.36	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Bis(2-chloroisopropyl) Ether	108-60-1	10	0.36	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Bis(2-chloroisopropyl) Ether	108-60-1	20	0.72	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Bis(2-chloroisopropyl) Ether	108-60-1	11	0.39	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Bis(2-chloroisopropyl) Ether	108-60-1	10	0.36	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Bis(2-chloroisopropyl) Ether	108-60-1	50	1.8	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Bis(2-chloroisopropyl) Ether	108-60-1	25.8	7.74	ND	ND	µg/L	Water	NA	5
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	10	0.34	7.3	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	10	0.34	8.2	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	20	0.68	9.5	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	11	0.37	10	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	10	0.34	7.8	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	50	1.7	ND	UB	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	25.8	7.74	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	50	15	77.1		µg/L	Water	NA	10
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	498	150	ND	ND	ug/L	Water	NA	100
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	99	30	95	J	ug/L	Water	NA	20
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	10	1.3	4.3	J	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	2.5	0.65	5.6		ug/L	Water	NA	5
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	12	12	ND	ND	ug/L	Water	NA	20
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	5.8	5.8	7.2		ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	15	15	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	12	12	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	20	15	ND	ND	ug/L	Water	NA	25

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Bis(2-ethylhexyl) Phthalate	117-81-7	8	5.8	8.7		ug/L	Water	NA	10
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Bisphenol A	80-05-7	NA	0.5	0.55		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-BIS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-113 Rev	NA	Bisphenols	Bisphenol A	80-05-7	14.8	NA	1290		ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Bisphenol A	80-05-7	17.9	NA	1590	D	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-BIS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-113 Rev	NA	Bisphenols	Bisphenol AF	1478-61-1	1.95	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-BIS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-113 Rev	NA	Bisphenols	Bisphenol B	77-40-7	5.06	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-BIS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-113 Rev	NA	Bisphenols	Bisphenol E	2081-08-5	23.1	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-BIS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-113 Rev	NA	Bisphenols	Bisphenol F	620-92-8	25.9	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-BIS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-113 Rev	NA	Bisphenols	Bisphenol S	80-09-1	1.22	NA	888		ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Bromodichloromethane	75-27-4	0.5	0.086	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Bromodichloromethane	75-27-4	0.5	0.086	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Bromodichloromethane	75-27-4	0.5	0.038	0.06	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Bromodichloromethane	75-27-4	0.5	0.038	0.04	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Bromodichloromethane	75-27-4	0.5	0.038	0.08	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Bromodichloromethane	75-27-4	0.5	0.038	0.07	J	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Bromodichloromethane	75-27-4	5	1.1	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Bromodichloromethane	75-27-4	1	0.22	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Bromodichloromethane	75-27-4	5	1.1	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Bromodichloromethane	75-27-4	5	1.1	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Bromodichloromethane	75-27-4	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Bromodichloromethane	75-27-4	0.5	0.01	0.05	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Bromodichloromethane	75-27-4	0.5	0.2	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Bromodichloromethane	75-27-4	5	1.1	ND	ND	ug/L	Water	NA	5
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Bromodichloromethane	75-27-4	0.5	0.2	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Bromodichloromethane	75-27-4	0.5	0.2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Bromodichloromethane	75-27-4	0.5	0.2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Bromodichloromethane	75-27-4	5	0.2	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Bromoform	75-25-2	0.5	0.17	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Bromoform	75-25-2	0.5	0.17	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Bromoform	75-25-2	0.5	0.17	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Bromoform	75-25-2	0.5	0.17	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Bromoform	75-25-2	0.5	0.17	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Bromoform	75-25-2	0.5	0.17	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Bromoform	75-25-2	10	2.1	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Bromoform	75-25-2	2	0.42	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Bromoform	75-25-2	10	2.1	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Bromoform	75-25-2	10	2.1	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Bromoform	75-25-2	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Bromoform	75-25-2	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Bromoform	75-25-2	0.5	0.4	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Bromoform	75-25-2	5	0.4	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Bromoform	75-25-2	0.5	0.4	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Bromoform	75-25-2	0.5	0.4	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Bromoform	75-25-2	0.5	0.4	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Bromoform	75-25-2	5	0.4	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Bromomethane	74-83-9	0.5	0.072	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Bromomethane	74-83-9	0.5	0.072	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Bromomethane	74-83-9	0.5	0.034	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Bromomethane	74-83-9	0.5	0.034	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Bromomethane	74-83-9	0.5	0.034	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Bromomethane	74-83-9	0.5	0.034	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Bromomethane	74-83-9	5	1.15	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Bromomethane	74-83-9	1	0.23	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Bromomethane	74-83-9	5	1.15	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Bromomethane	74-83-9	5	1.15	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Bromomethane	74-83-9	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Bromomethane	74-83-9	0.5	0.01	0.09	J	ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Bromomethane	74-83-9	0.5	0.09	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Bromomethane	74-83-9	5	0.09	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Bromomethane	74-83-9	0.5	0.09	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Bromomethane	74-83-9	0.5	0.09	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Bromomethane	74-83-9	0.5	0.09	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Bromomethane	74-83-9	5	0.09	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	10	0.55	1.6	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	10	0.55	1.4	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	20	1.1	1.7	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	11	0.59	1.2	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	10	0.55	2.3	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	50	2.8	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	51.5	4.44	5.62	J	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	2	0.21	2.3		ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	0.5	0.11	1.2		ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	7.8	7.8	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	16	16	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	20	20	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	16	16	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	20	20	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Butyl Benzyl Phthalate	85-68-7	8	7.8	ND	ND	ug/L	Water	NA	10
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C1-Benzothiophenes	NA		2.57202	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C1-Benzothiophenes	NA		2.57202	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C1-Benzothiophenes	NA		2.57202	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C1-Benzothiophenes	NA		2.57202	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Benzothiophenes	NA		2.57	67.131		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C1-Chrysenes	NA		1.59872	35.302		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C1-Chrysenes	NA		1.59872	18.855		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C1-Chrysenes	NA		1.59872	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C1-Chrysenes	NA		1.59872	35.907		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Chrysenes	NA		1.6	23.326		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Chrysenes	NA		1.6	28.455		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Chrysenes	NA		1.6	23.853		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Chrysenes	NA		1.6	17.868		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C1-Decalins	NA		2.28336	686.01		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C1-Decalins	NA		2.28336	379.76		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C1-Decalins	NA		2.28336	1169.1		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C1-Decalins	NA		2.28336	392.04		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Decalins	NA		2.28	305.5		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Decalins	NA		2.28	294.15		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Decalins	NA		2.28	416.79		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Decalins	NA		2.28	301.89		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Decalins	NA		2.28	306.31		ng/L	Water	NA	1
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C1-Dibenzo(a,h)anthracenes	NA		2.27211	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C1-Dibenzothiophenes	NA		0.66998	35.78		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C1-Dibenzothiophenes	NA		0.66998	31.047		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C1-Dibenzothiophenes	NA		0.66998	ND	ND	ng/L	Water	NA	10

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C1-Dibenzothiophenes	NA		0.66998	19.066		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Dibenzothiophenes	NA		0.67	27.668		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Dibenzothiophenes	NA		0.67	31.791		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Dibenzothiophenes	NA		0.67	33.809		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Dibenzothiophenes	NA		0.67	23.673		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Dibenzothiophenes	NA		0.67	25.819		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C1-Fluoranthenes/Pyrenes	NA		2.4684	98.248		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C1-Fluoranthenes/Pyrenes	NA		2.4684	52.448		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C1-Fluoranthenes/Pyrenes	NA		2.4684	88.395		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C1-Fluoranthenes/Pyrenes	NA		2.4684	125.89		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Fluoranthenes/Pyrenes	NA		2.47	54.629		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Fluoranthenes/Pyrenes	NA		2.47	52.27		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Fluoranthenes/Pyrenes	NA		2.47	64.75		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Fluoranthenes/Pyrenes	NA		2.47	40.322		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Fluoranthenes/Pyrenes	NA		2.47	63.007		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C1-Fluorenes	NA		1.62654	53.453		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C1-Fluorenes	NA		1.62654	38.667		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C1-Fluorenes	NA		1.62654	36.677		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C1-Fluorenes	NA		1.62654	72.913		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Fluorenes	NA		1.63	42.699		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Fluorenes	NA		1.63	49.624		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Fluorenes	NA		1.63	29.752		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Fluorenes	NA		1.63	37.17		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Fluorenes	NA		1.63	66.001		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C1-Naphthalenes	NA		1.36474	183.4		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C1-Naphthalenes	NA		1.36474	99.871		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C1-Naphthalenes	NA		1.36474	67.142		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C1-Naphthalenes	NA		1.36474	115.25		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Naphthalenes	NA		1.36	81.469		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Naphthalenes	NA		1.36	72.903		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Naphthalenes	NA		1.36	605.31		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Naphthalenes	NA		1.36	72.646		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Naphthalenes	NA		1.36	84.656		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C1-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C1-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C1-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C1-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C1-Phenanthrenes/Anthracenes	NA		0.70098	174.82		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C1-Phenanthrenes/Anthracenes	NA		0.70098	97.544		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C1-Phenanthrenes/Anthracenes	NA		0.70098	100.98		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C1-Phenanthrenes/Anthracenes	NA		0.70098	149.86		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Phenanthrenes/Anthracenes	NA		0.7	72.081		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Phenanthrenes/Anthracenes	NA		0.7	92.285		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Phenanthrenes/Anthracenes	NA		0.7	88.249		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Phenanthrenes/Anthracenes	NA		0.7	67.875		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C1-Phenanthrenes/Anthracenes	NA		0.7	98.17		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C20-TAS	NA		2.59957	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C20-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C20-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C20-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C20-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C20-TAS	NA		2.6	7.726		ng/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C20-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C20-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C20-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C21-TAS	NA		2.59957	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C21-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C21-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C21-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C21-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C21-TAS	NA		2.6	8.216		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C21-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C21-TAS	NA		2.6	7.67	J	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C21-TAS	NA		2.6	8.695		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C26(20R)/C27(20S)-TAS	NA		2.59957	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C26(20R)/C27(20S)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C26(20R)/C27(20S)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C26(20R)/C27(20S)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C26(20R)/C27(20S)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C26(20R)/C27(20S)-TAS	NA		2.6	48.382		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C26(20R)/C27(20S)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C26(20R)/C27(20S)-TAS	NA		2.6	36.555		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C26(20R)/C27(20S)-TAS	NA		2.6	60.385		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C26(20S)-TAS	NA		2.59957	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C26(20S)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C26(20S)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C26(20S)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C26(20S)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C26(20S)-TAS	NA		2.6	11.195		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C26(20S)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C26(20S)-TAS	NA		2.6	7.133	J	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C26(20S)-TAS	NA		2.6	14.713		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C27(20R)-TAS	NA		2.59957	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C27(20R)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C27(20R)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C27(20R)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C27(20R)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C27(20R)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C27(20R)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C27(20R)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C27(20R)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C28(20R)-TAS	NA		2.59957	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C28(20R)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C28(20R)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C28(20R)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C28(20R)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C28(20R)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C28(20R)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C28(20R)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C28(20R)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C28(20S)-TAS	NA		2.59957	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C28(20S)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C28(20S)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C28(20S)-TAS	NA		2.59957	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C28(20S)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C28(20S)-TAS	NA		2.6	19.892		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C28(20S)-TAS	NA		2.6	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C28(20S)-TAS	NA		2.6	15.105		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C28(20S)-TAS	NA		2.6	18.838		ng/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C29-Hopane	NA		8.19374	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C29-Hopane	NA		8.19374	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C29-Hopane	NA		8.19374	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C29-Hopane	NA		8.19374	186.76		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C29-Hopane	NA		8.19	103.53		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C29-Hopane	NA		8.19	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C29-Hopane	NA		8.19	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C29-Hopane	NA		8.19	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C29-Hopane	NA		8.19	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C2-Benzothiophenes	NA		2.57202	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C2-Benzothiophenes	NA		2.57202	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C2-Benzothiophenes	NA		2.57202	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C2-Benzothiophenes	NA		2.57202	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Benzothiophenes	NA		2.57	121.4		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C2-Chrysenes	NA		1.59872	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C2-Chrysenes	NA		1.59872	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C2-Chrysenes	NA		1.59872	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C2-Chrysenes	NA		1.59872	82.871		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C2-Decalins	NA		2.28336	1127.2		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C2-Decalins	NA		2.28336	644.32		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C2-Decalins	NA		2.28336	631.61		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C2-Decalins	NA		2.28336	818.11		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Decalins	NA		2.28	530.76		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Decalins	NA		2.28	617.25		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Decalins	NA		2.28	603.29		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Decalins	NA		2.28	425.76		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Decalins	NA		2.28	479.23		ng/L	Water	NA	1
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C2-Dibenzo(a,h)anthracenes	NA		2.27211	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C2-Dibenzothiophenes	NA		1.33997	40.335		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C2-Dibenzothiophenes	NA		1.33997	37.562		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C2-Dibenzothiophenes	NA		1.33997	27.085		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C2-Dibenzothiophenes	NA		1.33997	27.989		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Dibenzothiophenes	NA		1.34	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Dibenzothiophenes	NA		1.34	22.804		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Dibenzothiophenes	NA		1.34	21.659		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Dibenzothiophenes	NA		1.34	20.787		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Dibenzothiophenes	NA		1.34	23.505		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C2-Fluoranthenes/Pyrenes	NA		2.4684	37.028		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C2-Fluoranthenes/Pyrenes	NA		2.4684	26.374		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C2-Fluoranthenes/Pyrenes	NA		2.4684	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C2-Fluoranthenes/Pyrenes	NA		2.4684	42.774		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Fluoranthenes/Pyrenes	NA		2.47	25.017		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Fluoranthenes/Pyrenes	NA		2.47	14.542		ng/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Fluoranthenes/Pyrenes	NA		2.47	21.634		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Fluoranthenes/Pyrenes	NA		2.47	14.633		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Fluoranthenes/Pyrenes	NA		2.47	32.149		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C2-Fluorenes	NA		1.62654	163.36		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C2-Fluorenes	NA		1.62654	112.59		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C2-Fluorenes	NA		1.62654	98.553		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C2-Fluorenes	NA		1.62654	154.29		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Fluorenes	NA		1.63	90.657		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Fluorenes	NA		1.63	45.941		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Fluorenes	NA		1.63	32.419		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Fluorenes	NA		1.63	47.213		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Fluorenes	NA		1.63	154.51		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C2-Naphthalenes	NA		5.81531	436.84		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C2-Naphthalenes	NA		5.81531	115.35		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C2-Naphthalenes	NA		5.81531	63.221		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C2-Naphthalenes	NA		5.81531	228.71		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Naphthalenes	NA		5.82	109.35		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Naphthalenes	NA		5.82	110.08		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Naphthalenes	NA		5.82	698.85		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Naphthalenes	NA		5.82	163.56		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Naphthalenes	NA		5.82	199.64		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C2-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C2-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C2-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C2-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C2-Phenanthrenes/Anthracenes	NA		3.03035	215.52		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C2-Phenanthrenes/Anthracenes	NA		3.03035	83.522		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C2-Phenanthrenes/Anthracenes	NA		3.03035	113		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C2-Phenanthrenes/Anthracenes	NA		3.03035	141.44		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Phenanthrenes/Anthracenes	NA		3.03	69.017		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Phenanthrenes/Anthracenes	NA		3.03	74.105		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Phenanthrenes/Anthracenes	NA		3.03	75.443		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Phenanthrenes/Anthracenes	NA		3.03	53.187		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C2-Phenanthrenes/Anthracenes	NA		3.03	98.248		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C30-Hopane	NA		8.19374	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C30-Hopane	NA		8.19374	193.96		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C30-Hopane	NA		8.19374	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C30-Hopane	NA		8.19374	218.62		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C30-Hopane	NA		8.19	165.31		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C30-Hopane	NA		8.19	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C30-Hopane	NA		8.19	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C30-Hopane	NA		8.19	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C30-Hopane	NA		8.19	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C3-Benzothiophenes	NA		2.57202	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C3-Benzothiophenes	NA		2.57202	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C3-Benzothiophenes	NA		2.57202	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C3-Benzothiophenes	NA		2.57202	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Benzothiophenes	NA		2.57	119.68		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C3-Chrysenes	NA		1.59872	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C3-Chrysenes	NA		1.59872	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C3-Chrysenes	NA		1.59872	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C3-Chrysenes	NA		1.59872	43.193		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C3-Decalins	NA		2.28336	1008.8		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C3-Decalins	NA		2.28336	607.69		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C3-Decalins	NA		2.28336	483.3		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C3-Decalins	NA		2.28336	1751.2		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Decalins	NA		2.28	538.07		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Decalins	NA		2.28	1035.1		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Decalins	NA		2.28	643.85		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Decalins	NA		2.28	503.9		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Decalins	NA		2.28	560.37		ng/L	Water	NA	1
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C3-Dibenzo(a,h)anthracenes	NA		2.27211	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Dibenzo(a,h)anthracenes	NA			ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C3-Dibenzothiophenes	NA		1.33997	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C3-Dibenzothiophenes	NA		1.33997	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C3-Dibenzothiophenes	NA		1.33997	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C3-Dibenzothiophenes	NA		1.33997	101.46		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Dibenzothiophenes	NA		1.34	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Dibenzothiophenes	NA		1.34	59.597		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Dibenzothiophenes	NA		1.34	62.476		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Dibenzothiophenes	NA		1.34	44.73		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Dibenzothiophenes	NA		1.34	65.315		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C3-Fluoranthenes/Pyrenes	NA		2.4684	22.402		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C3-Fluoranthenes/Pyrenes	NA		2.4684	12.132		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C3-Fluoranthenes/Pyrenes	NA		2.4684	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C3-Fluoranthenes/Pyrenes	NA		2.4684	26.968		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Fluoranthenes/Pyrenes	NA		2.47	12.378		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Fluoranthenes/Pyrenes	NA		2.47	15.272		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Fluoranthenes/Pyrenes	NA		2.47	14.116		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Fluoranthenes/Pyrenes	NA		2.47	9.015		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Fluoranthenes/Pyrenes	NA		2.47	20.392		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C3-Fluorenes	NA		1.62654	259.78		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C3-Fluorenes	NA		1.62654	137.49		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C3-Fluorenes	NA		1.62654	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C3-Fluorenes	NA		1.62654	301.35		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Fluorenes	NA		1.63	78.666		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Fluorenes	NA		1.63	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Fluorenes	NA		1.63	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Fluorenes	NA		1.63	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Fluorenes	NA		1.63	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C3-Naphthalenes	NA		5.81531	178.88		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C3-Naphthalenes	NA		5.81531	345.83		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C3-Naphthalenes	NA		5.81531	338.69		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C3-Naphthalenes	NA		5.81531	514.06		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Naphthalenes	NA		5.82	231.96		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Naphthalenes	NA		5.82	392.06		ng/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Naphthalenes	NA		5.82	373.88		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Naphthalenes	NA		5.82	304.55		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Naphthalenes	NA		5.82	164.6		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C3-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C3-Naphthobenzothiophenes	NA		2.06671	29.498		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C3-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C3-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C3-Phenanthrenes/Anthracenes	NA		3.03035	109.46		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C3-Phenanthrenes/Anthracenes	NA		3.03035	62.116		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C3-Phenanthrenes/Anthracenes	NA		3.03035	81.069		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C3-Phenanthrenes/Anthracenes	NA		3.03035	95.171		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Phenanthrenes/Anthracenes	NA		3.03	48.391		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Phenanthrenes/Anthracenes	NA		3.03	63.175		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Phenanthrenes/Anthracenes	NA		3.03	44.605		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Phenanthrenes/Anthracenes	NA		3.03	32.443		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C3-Phenanthrenes/Anthracenes	NA		3.03	75.893		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C4-Benzothiophenes	NA		2.57202	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C4-Benzothiophenes	NA		2.57202	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C4-Benzothiophenes	NA		2.57202	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C4-Benzothiophenes	NA		2.57202	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Benzothiophenes	NA		2.57	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C4-Chrysenes	NA		1.59872	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C4-Chrysenes	NA		1.59872	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C4-Chrysenes	NA		1.59872	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C4-Chrysenes	NA		1.59872	86.206		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Chrysenes	NA		1.6	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C4-Decalins	NA		2.28336	683.55		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C4-Decalins	NA		2.28336	756.44		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C4-Decalins	NA		2.28336	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C4-Decalins	NA		2.28336	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Decalins	NA		2.28	354.97		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Decalins	NA		2.28	467.4		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Decalins	NA		2.28	505.94		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Decalins	NA		2.28	443.22		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Decalins	NA		2.28	329.95		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C4-Dibenzothiophenes	NA		1.33997	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C4-Dibenzothiophenes	NA		1.33997	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C4-Dibenzothiophenes	NA		1.33997	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C4-Dibenzothiophenes	NA		1.33997	41.954		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Dibenzothiophenes	NA		1.34	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Dibenzothiophenes	NA		1.34	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Dibenzothiophenes	NA		1.34	47.416		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Dibenzothiophenes	NA		1.34	39.228		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Dibenzothiophenes	NA		1.34	46.049		ng/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C4-Fluoranthenes/Pyrenes	NA		2.4684	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C4-Fluoranthenes/Pyrenes	NA		2.4684	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C4-Fluoranthenes/Pyrenes	NA		2.4684	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C4-Fluoranthenes/Pyrenes	NA		2.4684	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Fluoranthenes/Pyrenes	NA		2.47	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Fluoranthenes/Pyrenes	NA		2.47	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Fluoranthenes/Pyrenes	NA		2.47	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Fluoranthenes/Pyrenes	NA		2.47	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Fluoranthenes/Pyrenes	NA		2.47	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C4-Naphthalenes	NA		5.81531	189.41		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C4-Naphthalenes	NA		5.81531	180.1		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C4-Naphthalenes	NA		5.81531	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C4-Naphthalenes	NA		5.81531	188.62		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Naphthalenes	NA		5.82	151.67		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Naphthalenes	NA		5.82	135.8		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Naphthalenes	NA		5.82	150.13		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Naphthalenes	NA		5.82	155.37		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Naphthalenes	NA		5.82	181.51		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C4-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C4-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C4-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C4-Naphthobenzothiophenes	NA		2.06671	ND	ND	ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Naphthobenzothiophenes	NA		2.07	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	C4-Phenanthrenes/Anthracenes	NA		3.03035	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	C4-Phenanthrenes/Anthracenes	NA		3.03035	41.316		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	C4-Phenanthrenes/Anthracenes	NA		3.03035	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	C4-Phenanthrenes/Anthracenes	NA		3.03035	51.16		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Phenanthrenes/Anthracenes	NA		3.03	32.459		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Phenanthrenes/Anthracenes	NA		3.03	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Phenanthrenes/Anthracenes	NA		3.03	28.306		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Phenanthrenes/Anthracenes	NA		3.03	22.448		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	C4-Phenanthrenes/Anthracenes	NA		3.03	38.207		ng/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-006	MOA16TML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.005	0.309		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-002	MOA16TML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.007	0.27		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-012	MOA16TML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.005	0.265		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-013	MOA15TML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.005	0.256		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-024	MOA18TML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.009	0.252		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-004	MOA18TML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.009	0.248		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-002	MOA17TML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.007	0.24		µg/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-013	M20W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.229		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-007	MOA15TML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.009	0.226		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-002DUP	MOA15TML006	SummerDry	Effluent	Final Effluent	Lab Dup	06/18/2015	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.009	0.222		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-006	MOA16TML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.007	0.22		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-002	MOA17TML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.007	0.218		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-002	MOA16TML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.007	0.217		µg/L	Water	NA	1
2020	ALS Environmental - WA	KQ2008836-03	M20D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/24/2020	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.216		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-003	MOA15TML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.005	0.214		µg/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-018	M20D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.213		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-016	M21W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.212		ug/L	Water	NA	1
2022	ALS Environmental - WA	KQ2213818-05	M22W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	Lab Dup	8/8/2022	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.211		ug/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-004	MOA18TML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.006	0.21		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-002	MOA17TML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.007	0.209		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-002	MOA16TML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.005	0.208		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2019	ALS Environmental - WA	K1909781-003	M19W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.207		ug/L	Water	NA	1
2017	ALS Environmental - WA	KQ1711770-05	MOA17TML008	SummerWet	Effluent	Final Effluent	Lab Dup	08/08/2017	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.007	0.205		µg/L	Water	NA	1
2020	ALS Environmental - WA	KQ2011526-03	M20W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	Lab Dup	8/10/2020	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.204		ug/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-014	MOA18TML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.009	0.203		µg/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-024	M21D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.202		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-008	M21W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.2		ug/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-014	MOA18TML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.006	0.199		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-008	M19W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.198		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-016	M21D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.198		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-018	M19W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.197		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-016	M23W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.193		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-008	M21D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.192		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-023	M19D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.19		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-008	M22D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.189		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-024	M21W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.188		ug/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-051	MOA17TML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.007	0.186		µg/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-024	M22D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.185		ug/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-041	MOA17TML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.007	0.183		µg/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-06	M23D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	Lab Dup	6/22/2023	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.18		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-016	M22D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.178		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-024	M23W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.178		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-023	M20W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.177		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-006	M23D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.176		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-006DUP	MOA15TML002	SummerDry	Effluent	Final Effluent	Lab Dup	06/16/2015	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.009	0.176		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-013	M19D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.175		ug/L	Water	NA	1
2019	ALS Environmental - WA	KQ1908740-03	M19D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/19/2019	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.172		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-024	M22W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.168		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-028	M20D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.165		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-008	M23W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.164		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-04	M23D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/21/2023	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.161		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-018	MOA15TML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.009	0.155		µg/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-016	M22W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.008	0.151		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-18	M23R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1640 Column	Total	Metals	Cadmium	7440-43-9	0.01	0.001	0.151		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-32	M22R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Total	Metals	Cadmium	7440-43-9	0.18	0.06	0.149	J	ug/L	Water	NA	10
2016	Brooks Applied Labs	1626048-22	MOA16TMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Total	Metals	Cadmium	7440-43-9	0.012	0.004	0.138		µg/L	Water	NA	1
2020	Brooks Applied Labs	2026050-02RE2	M20R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Total	Metals	Cadmium	7440-43-9	0.024	0.008	0.128		ug/L	Water	NA	2
2018	ALS Environmental - WA	K1806181-024	MOA18TML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Total	Metals	Cadmium	7440-43-9	0.02	0.006	0.126		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-16RE1	MOA18TMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Total	Metals	Cadmium	7440-43-9	0.012	0.004	0.126		µg/L	Water	NA	1
2019	Brooks Applied Labs	1925069-18	M19R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1640 RP	Total	Metals	Cadmium	7440-43-9	0.012	0.004	0.123	J-	ug/L	Water	NA	1
2017	Brooks Applied Labs	1723032-17RE2	MOA17DMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Total	Metals	Cadmium	7440-43-9	0.012	0.004	0.107	J	µg/L	Water	NA	1
2021	Brooks Applied Labs	2106131-18RE1	M21R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Total	Metals	Cadmium	7440-43-9	0.012	0.004	0.081		ug/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Caffeine	58-08-2	NA	0.0683	105		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Caffeine	58-08-2	119	NA	45100	D	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Carbadox	6804-07-5	NA	0.0015		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Carbadox	6804-07-5	0.691	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Carbamazepine	298-46-4	NA	0.0015	0.506		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Carbamazepine	298-46-4	0.298	NA	112		ng/L	Aqueous	NA	NA
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Carbazole	86-74-8		0.8334	192.82		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Carbazole	86-74-8		0.8334	170.14		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Carbazole	86-74-8		0.8334	60.323		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Carbazole	86-74-8		0.8334	114.7		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Carbazole	86-74-8		0.83	47.812		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Carbazole	86-74-8		0.83	119.71		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Carbazole	86-74-8		0.83	111.73		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Carbazole	86-74-8		0.83	87.079		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Carbazole	86-74-8		0.83	201.42		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Carbon Disulfide	75-15-0	0.5	0.032	0.67		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Carbon Disulfide	75-15-0	0.5	0.032	0.69		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Carbon Disulfide	75-15-0	0.5	0.032	0.59	J+	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Carbon Disulfide	75-15-0	0.5	0.032	ND	UB	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Carbon Disulfide	75-15-0	0.5	0.032	ND	UB	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Carbon Disulfide	75-15-0	0.5	0.032	0.69	J+	µg/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Carbon Disulfide	75-15-0	0.5	0.01	0.62	J+,B	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Carbon Disulfide	75-15-0	0.5	0.01	0.61	J+,B	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Carbon Disulfide	75-15-0	0.5	0.2	0.42	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Carbon Disulfide	75-15-0	5	0.2	0.69	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Carbon Disulfide	75-15-0	0.5	0.2	0.29	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Carbon Disulfide	75-15-0	0.5	0.2	0.7		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Carbon Disulfide	75-15-0	0.5	0.2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Carbon Disulfide	75-15-0	5	0.2	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Carbon Tetrachloride	56-23-5	0.5	0.12	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Carbon Tetrachloride	56-23-5	0.5	0.12	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Carbon Tetrachloride	56-23-5	0.5	0.06	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Carbon Tetrachloride	56-23-5	0.5	0.06	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Carbon Tetrachloride	56-23-5	0.5	0.06	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Carbon Tetrachloride	56-23-5	0.5	0.06	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Carbon Tetrachloride	56-23-5	5	1.7	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Carbon Tetrachloride	56-23-5	1	0.34	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Carbon Tetrachloride	56-23-5	5	1.7	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Carbon Tetrachloride	56-23-5	5	1.7	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Carbon Tetrachloride	56-23-5	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Carbon Tetrachloride	56-23-5	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Carbon Tetrachloride	56-23-5	0.5	0.2	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Carbon Tetrachloride	56-23-5	5	0.2	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Carbon Tetrachloride	56-23-5	0.5	0.2	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Carbon Tetrachloride	56-23-5	0.5	0.2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Carbon Tetrachloride	56-23-5	0.5	0.2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Carbon Tetrachloride	56-23-5	5	0.2	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Cefotaxime	63527-52-6	NA	0.0916		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Cefotaxime	63527-52-6	12	NA	ND	U	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Chlordane	57-74-9	0.21	0.099	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Chlordane	57-74-9	0.22	0.22	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Chlordane	57-74-9	0.47	0.47	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Chlordane	57-74-9	0.22	0.22	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Chlordane	57-74-9	0.2	0.19	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Chlordane	57-74-9	0.2	0.029	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Chlordane	57-74-9	1	0.33	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Chlordane	57-74-9	1	0.34	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Chlordane	57-74-9	0.77	0.77	ND	U,J-	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Chlordane	57-74-9	0.5	0.1	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Chlordane	57-74-9	0.22	0.22	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Chlordane	57-74-9	2.3	2.3	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Chlordane	57-74-9	1.9	0.038	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Chlordane	57-74-9	1.9		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Chlordane	57-74-9	0.37	0.37	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Chlordane	57-74-9	0.2	0.2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Chlordane	57-74-9	0.2	0.2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Chlordane	57-74-9	0.2	0.2	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Chlordane, alpha (cis)	5103-71-9	NA	0.0001	0.0001		ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Chlordane, oxy-	27304-13-8	NA	0.00018		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Chlorobenzene	108-90-7	0.5	0.031	0.05	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Chlorobenzene	108-90-7	0.5	0.031	0.08	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Chlorobenzene	108-90-7	0.5	0.031	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Chlorobenzene	108-90-7	0.5	0.031	0.04	J	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Chlorobenzene	108-90-7	0.5	0.031	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Chlorobenzene	108-90-7	0.5	0.031	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Chlorobenzene	108-90-7	5	0.8	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Chlorobenzene	108-90-7	1	0.16	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Chlorobenzene	108-90-7	5	0.8	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Chlorobenzene	108-90-7	5	0.8	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Chlorobenzene	108-90-7	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Chlorobenzene	108-90-7	0.5	0.01	0.03	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Chlorobenzene	108-90-7	0.5	0.05	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Chlorobenzene	108-90-7	5	0.05	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Chlorobenzene	108-90-7	0.5	0.05	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Chlorobenzene	108-90-7	0.5	0.05	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Chlorobenzene	108-90-7	0.5	0.05	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Chlorobenzene	108-90-7	5	0.05	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Chloroethane	75-00-3	0.5	0.14	0.46	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Chloroethane	75-00-3	0.5	0.14	0.51		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Chloroethane	75-00-3	0.5	0.054	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Chloroethane	75-00-3	0.5	0.054	0.17	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Chloroethane	75-00-3	0.5	0.054	0.18	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Chloroethane	75-00-3	0.5	0.054	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Chloroethane	75-00-3	25	2.6	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Chloroethane	75-00-3	5	0.52	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Chloroethane	75-00-3	25	2.6	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Chloroethane	75-00-3	0.5	0.01	0.44	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Chloroethane	75-00-3	0.5	0.01	0.36	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Chloroethane	75-00-3	0.5	0.1	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Chloroethane	75-00-3	5	0.1	0.69	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Chloroethane	75-00-3	0.5	0.1	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Chloroethane	75-00-3	0.5	0.1	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Chloroethane	75-00-3	0.5	0.1	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Chloroethane	75-00-3	5	0.1	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Chloroform	67-66-3	0.5	0.062	2.7		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Chloroform	67-66-3	0.5	0.062	2.3		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Chloroform	67-66-3	0.5	0.036	3.3		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Chloroform	67-66-3	0.5	0.036	2.5	J+	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Chloroform	67-66-3	0.5	0.036	2.7		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Chloroform	67-66-3	0.5	0.036	2.9		µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Chloroform	67-66-3	5	1.75	3.95	J	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Chloroform	67-66-3	1	0.35	2.68		µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Chloroform	67-66-3	5	1.75	3.25	J	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Chloroform	67-66-3	5	1.75	2.8	J	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Chloroform	67-66-3	0.5	0.01	2.7		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Chloroform	67-66-3	0.5	0.01	1.9		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Chloroform	67-66-3	5	0.07	2.9	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Chloroform	67-66-3	0.5	0.07	2.3		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Chloroform	67-66-3	0.5	0.07	3.3		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Chloroform	67-66-3	0.5	0.07	2		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Chloroform	67-66-3	5	0.07	2.1	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Chloroform	67-66-3	0.5	0.07	2		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Chloromethane	74-87-3	0.5	0.03	0.93		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Chloromethane	74-87-3	0.5	0.03	1.2		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Chloromethane	74-87-3	0.5	0.03	0.71	J+	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Chloromethane	74-87-3	0.5	0.03	0.59		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Chloromethane	74-87-3	0.5	0.03	0.37	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Chloromethane	74-87-3	0.5	0.03	1.1		µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Chloromethane	74-87-3	5	1.8	ND	ND	µg/L	Water	NA	5

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Chloromethane	74-87-3	1	0.36	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Chloromethane	74-87-3	5	1.8	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Chloromethane	74-87-3	5	1.8	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Chloromethane	74-87-3	0.5	0.01	1.9	J+,B	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Chloromethane	74-87-3	0.5	0.01	1.6	J+,B	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Chloromethane	74-87-3	0.5	0.06	0.91	J+,B	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Chloromethane	74-87-3	5	0.06	1.9	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Chloromethane	74-87-3	0.5	0.06	1.4		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Chloromethane	74-87-3	0.5	0.06	0.53		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Chloromethane	74-87-3	5	0.06	0.96	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Chloromethane	74-87-3	0.5	0.06	0.75		ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Chlorpyriphos	2921-88-2	NA	0.00026	0.001		ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Chlorpyriphos-Methyl	5598-13-0	NA	0.00011	0.0002		ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Chlorpyriphos-Oxon	5598-15-2	NA	0.0006		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Chlortetracycline [CTC]	57-62-5	NA	0.018		U	ug/L	Water	NA	NA
2019	ALS Environmental - WA	K1905862-008	M19D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	2.27		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-013	M19D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	2.13		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-023	M19D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.99		ug/L	Water	NA	1
2019	Brooks Applied Labs	B191820-DUP2	M19R-MTT-EF	RecWater	Effluent	Final Effluent	Lab Dup	06/18/2019	EPA 1640 RP	Total	Metals	Chromium	7440-47-3	0.1	0.04	0.944		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-003	M19W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	3.28		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-008	M19W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	3.46		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-018	M19W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	2.61		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-003	M20D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.42		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-018	M20D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.6		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-028	M20D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.39		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-02RE2	M20R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Total	Metals	Chromium	7440-47-3	0.2	0.08	0.807		ug/L	Water	NA	2
2020	ALS Environmental - WA	K2006972-003	M20W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.59		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-013	M20W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.86		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-023	M20W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.95		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-008	M21D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.66		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-016	M21D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.39		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-024	M21D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.43		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-18	M21R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Total	Metals	Chromium	7440-47-3	0.1	0.04	0.91		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-008	M21W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.26		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-016	M21W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.44		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-024	M21W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.86		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-008	M22D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.57		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-016	M22D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.58		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-024	M22D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.6		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-32	M22R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Total	Metals	Chromium	7440-47-3	6	1.7	2.4	J	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209249-008	M22W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	2.24		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-016	M22W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.73		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-024	M22W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.65		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-04	M23D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/21/2023	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.64		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-06	M23D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	Lab Dup	6/22/2023	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.53		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-006	M23D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.51		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-18	M23R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1638M	Total	Metals	Chromium	7440-47-3	6.01	1.7	ND	ND	ug/L	Water	NA	10
2023	ALS Environmental - WA	K2309291-008	M23W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.55		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-016	M23W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.82		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-024	M23W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.75		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-006	MOA15TML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	2.45		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-018	MOA15TML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.75		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-002DUP	MOA15TML006	SummerDry	Effluent	Final Effluent	Lab Dup	06/18/2015	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.48		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-007	MOA15TML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.37		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-003	MOA15TML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.02	1.8		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-013	MOA15TML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.02	1.77		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-006	MOA16TML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.02	2.15		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2016	ALS Environmental - WA	K1607065-002	MOA16TML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.02	1.69		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-012	MOA16TML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.02	2.48		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-006	MOA16TML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	2.27		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-002	MOA16TML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	2.09		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-002	MOA16TML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	2		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-22	MOA16TMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Total	Metals	Chromium	7440-47-3	0.038	0.019	1.82	J	µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-17RE2	MOA17DMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Total	Metals	Chromium	7440-47-3	0.1	0.04	1.54		µg/L	Water	NA	1
2017	Brooks Applied Labs	B172484-DUP1	MOA17DMT018	RecWater	Effluent	Final Effluent	Lab Dup		ICP-MS	Total	Metals	Chromium	7440-47-3	0.081	0.036	0.496		µg/L	Water	NA	2
2017	ALS Environmental - WA	K1705998-002	MOA17TML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.51		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-002	MOA17TML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.48		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-002	MOA17TML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.52		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-008	MOA17TML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	2.07		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-041	MOA17TML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	2.11		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-051	MOA17TML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	2		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-004	MOA18TML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.57		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-014	MOA18TML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.53		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-024	MOA18TML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-004	MOA18TML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.53		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-014	MOA18TML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	2.18		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-024	MOA18TML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Total	Metals	Chromium	7440-47-3	0.2	0.03	1.97		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-16RE3	MOA18TMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Total	Metals	Chromium	7440-47-3	0.1	0.04	1.19		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Chrysene	218-01-9	10	0.4	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Chrysene	218-01-9	20	0.8	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Chrysene	218-01-9	11	0.43	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Chrysene	218-01-9	10	0.4	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Chrysene	218-01-9	50	2	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Chrysene	218-01-9	25.8	6.19	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Chrysene	218-01-9	50	12	ND	ND	µg/L	Water	NA	10
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Chrysene	218-01-9	99	24	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Chrysene	218-01-9	498	120	ND	ND	ug/L	Water	NA	100
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Chrysene	218-01-9	2	0.28	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Chrysene	218-01-9	0.5	0.14	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Chrysene	218-01-9	3.8	0.79	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Chrysene	218-01-9	4	1.6	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Chrysene	218-01-9	4.7	2	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Chrysene	218-01-9	3.8	1.6	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Chrysene	218-01-9	20	2	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Chrysene	218-01-9	8	0.79	ND	ND	ug/L	Water	NA	10
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Chrysene/Triphenylene	3-01-9, 217-59-4		0.79936	44.751		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Chrysene/Triphenylene	3-01-9, 217-59-4		0.79936	23.412		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Chrysene/Triphenylene	3-01-9, 217-59-4		0.79936	53.619		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Chrysene/Triphenylene	3-01-9, 217-59-4		0.79936	61.43		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Chrysene/Triphenylene	3-01-9, 217-59-4		0.8	29.13		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Chrysene/Triphenylene	3-01-9, 217-59-4		0.8	30.066		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Chrysene/Triphenylene	3-01-9, 217-59-4		0.8	32.192		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Chrysene/Triphenylene	3-01-9, 217-59-4		0.8	22.432		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Chrysene/Triphenylene	3-01-9, 217-59-4		0.8	30.332		ng/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Cimetidine	51481-61-9	NA	0.00179		U D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Cimetidine	51481-61-9	2.98	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Ciprofloxacin	85721-33-1	NA	0.024	0.372		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Ciprofloxacin	85721-33-1	1.49	NA	102		ng/L	Aqueous	NA	NA
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	cis/trans Decalin	91-17-8		1.14168	251.91		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	cis/trans Decalin	91-17-8		1.14168	483.6		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	cis/trans Decalin	91-17-8		1.14168	256.66		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	cis/trans Decalin	91-17-8		1.14168	407.13		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	cis/trans Decalin	91-17-8		1.14	388.23		ng/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	cis/trans Decalin	91-17-8		1.14	227.34		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	cis/trans Decalin	91-17-8		1.14	403.03		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	cis/trans Decalin	91-17-8		1.14	356.02		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	cis/trans Decalin	91-17-8		1.14	385.25		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	cis-1,2-Dichloroethene	156-59-2	0.5	0.036	0.07	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	cis-1,2-Dichloroethene	156-59-2	0.5	0.036	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	cis-1,2-Dichloroethene	156-59-2	0.5	0.036	0.05	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	cis-1,2-Dichloroethene	156-59-2	0.5	0.036	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	cis-1,2-Dichloroethene	156-59-2	0.5	0.036	0.04	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	cis-1,2-Dichloroethene	156-59-2	0.5	0.036	0.05	J	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	cis-1,2-Dichloroethene	156-59-2	5	1.8	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	cis-1,2-Dichloroethene	156-59-2	1	0.36	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	cis-1,2-Dichloroethene	156-59-2	5	1.8	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	cis-1,2-Dichloroethene	156-59-2	5	1.8	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	cis-1,2-Dichloroethene	156-59-2	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	cis-1,2-Dichloroethene	156-59-2	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	cis-1,2-Dichloroethene	156-59-2	0.5	0.036	0.07	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	cis-1,2-Dichloroethene	156-59-2	5	0.036	0.07	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	cis-1,2-Dichloroethene	156-59-2	0.5	0.05	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	cis-1,2-Dichloroethene	156-59-2	0.5	0.05	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	cis-1,2-Dichloroethene	156-59-2	0.5	0.05	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	cis-1,2-Dichloroethene	156-59-2	5	0.05	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	cis-1,3-Dichloropropene	10061-01-5	0.5	0.035	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	cis-1,3-Dichloropropene	10061-01-5	0.5	0.035	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	cis-1,3-Dichloropropene	10061-01-5	0.5	0.035	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	cis-1,3-Dichloropropene	10061-01-5	0.5	0.035	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	cis-1,3-Dichloropropene	10061-01-5	0.5	0.035	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	cis-1,3-Dichloropropene	10061-01-5	5	1	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	cis-1,3-Dichloropropene	10061-01-5	1	0.2	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	cis-1,3-Dichloropropene	10061-01-5	5	1	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	cis-1,3-Dichloropropene	10061-01-5	5	1	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	cis-1,3-Dichloropropene	10061-01-5	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	cis-1,3-Dichloropropene	10061-01-5	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	cis-1,3-Dichloropropene	10061-01-5	0.5	0.09	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	cis-1,3-Dichloropropene	10061-01-5	5	0.09	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	cis-1,3-Dichloropropene	10061-01-5	0.5	0.09	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	cis-1,3-Dichloropropene	10061-01-5	0.5	0.09	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	cis-1,3-Dichloropropene	10061-01-5	0.5	0.09	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	cis-1,3-Dichloropropene	10061-01-5	5	0.09	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Clarithromycin	81103-11-9	NA	0.00144	0.165		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Clarithromycin	81103-11-9	0.298	NA	40.7		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Clinafloxacin	105956-97-6	NA	0.184		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Clinafloxacin	105956-97-6	1.98	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Clonidine	4205-90-7	NA	0.00447		U D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Clonidine	4205-90-7	5.97	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Cloxacillin	61-72-3	NA	0.003		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Cloxacillin	61-72-3	2.98	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Cocaine	50-36-2	NA	0.00102	0.768		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Cocaine	50-36-2	0.149	NA	568		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Codeine	76-57-3	NA	0.00874	0.152	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Codeine	76-57-3	5.97	NA	58.3	D	ng/L	Aqueous	NA	NA
2019	ALS Environmental - WA	KQ1908740-03	M19D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/19/2019	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	42.9		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-013	M19D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	60.8		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-023	M19D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	44		ug/L	Water	NA	1
2019	Brooks Applied Labs	1925069-18	M19R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1640 RP	Total	Metals	Copper	7440-50-8	0.07	0.03	17.1	J+,B	ug/L	Water	NA	1
2019	ALS Environmental - WA	KQ1915567-01	M19W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	Lab Dup	9/10/2019	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	36		ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2019	ALS Environmental - WA	K1908450-008	M19W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	33.2		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-018	M19W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	39.8		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-003	M20D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	36.2		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-018	M20D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	47.7		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-028	M20D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	37.6		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-02RE2	M20R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Total	Metals	Copper	7440-50-8	0.14	0.06	12.6		ug/L	Water	NA	2
2020	ALS Environmental - WA	K2006972-003	M20W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	33.8		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-013	M20W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	46.4		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-023	M20W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	50.2		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-008	M21D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	52.8		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-016	M21D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	42.2		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-024	M21D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	40.2		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-18	M21R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Total	Metals	Copper	7440-50-8	0.1	0.05	17.7		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-008	M21W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	35.4		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-016	M21W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	35.8		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-024	M21W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	52.5		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-008	M22D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	37.1		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-016	M22D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	34.8		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-024	M22D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	35.8		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-32	M22R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Total	Metals	Copper	7440-50-8	1	0.5	28.8		ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209249-008	M22W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	32.1		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-016	M22W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	26.9		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-024	M22W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	33.9		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-04	M23D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/21/2023	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	34.9		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-06	M23D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	Lab Dup	6/22/2023	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	41.8		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-006	M23D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	40.3		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-18RE1	M23R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1640 Column	Total	Metals	Copper	7440-50-8	0.27	0.09	26		ug/L	Water	NA	5
2023	ALS Environmental - WA	K2309291-008	M23W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	39.3		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-016	M23W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	37.7		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-024	M23W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Total	Metals	Copper	7440-50-8	0.1	0.05	30.1		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-006	MOA15TML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	40.1		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-018	MOA15TML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	49.1		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-002	MOA15TML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	115		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-007	MOA15TML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	35.5		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-003	MOA15TML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Total	Metals	Copper	7440-50-8	0.1	0.03	36.1		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-013	MOA15TML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Total	Metals	Copper	7440-50-8	0.1	0.03	37.6		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-006	MOA16TML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Total	Metals	Copper	7440-50-8	0.1	0.03	35.9		µg/L	Water	NA	1
2016	ALS Environmental - WA	KQ1608088-05	MOA16TML004	SummerDry	Effluent	Final Effluent	Lab Dup	06/23/2016	200.8	Total	Metals	Copper	7440-50-8	0.1	0.03	35.3		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-012	MOA16TML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Total	Metals	Copper	7440-50-8	0.1	0.03	40.1		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-006	MOA16TML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	28.8		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-002	MOA16TML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	26.2		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-002	MOA16TML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	27.4		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-22	MOA16TMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Total	Metals	Copper	7440-50-8	0.07	0.03	11.6	J	µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-17	MOA17DMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Total	Metals	Copper	7440-50-8	0.07	0.03	25.1		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-002	MOA17TML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	52		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-002	MOA17TML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	46.3		µg/L	Water	NA	1
2017	ALS Environmental - WA	KQ1707755-03	MOA17TML006	SummerDry	Effluent	Final Effluent	Lab Dup	06/09/2017	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	50.3		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-008	MOA17TML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	33.7		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-041	MOA17TML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	38.7		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-051	MOA17TML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	38.1		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-004	MOA18TML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Total	Metals	Copper	7440-50-8	0.1	0.04	36.2		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-014	MOA18TML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Total	Metals	Copper	7440-50-8	0.1	0.04	36.5		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-024	MOA18TML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Total	Metals	Copper	7440-50-8	0.1	0.04	24.4		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-004	MOA18TML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	33.6		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-014	MOA18TML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	30.6		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-024	MOA18TML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Total	Metals	Copper	7440-50-8	0.1	0.02	34		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-16RE1	MOA18TMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Total	Metals	Copper	7440-50-8	0.11	0.03	22.7		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Cotinine	486-56-6	NA	0.00579	2.8	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Cotinine	486-56-6	1.49	NA	2100	D	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Cyanazine	21725-46-2	NA	0.0176		U	ug/L	Water	NA	NA
2019	ALS Environmental - WA	K1905862-006	M19D-TCN-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-011	M19D-TCN-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-021	M19D-TCN-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	ND	ND	ug/L	Water	NA	1
2019	Soil Control Lab	9060775-01	M19R-CYA-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	EPA 335.2		Cyanide	Cyanide, Total	57-12-5	1	0.34	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-001	M19W-TCN-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	10/17/2019	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	0.8	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-006	M19W-TCN-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-016	M19W-TCN-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-001	M20D-TCN-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-016	M20D-TCN-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	0.7	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-026	M20D-TCN-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005386-008	M20R-CYA-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	335.4		Cyanide	Cyanide, Total	57-12-5	5	0.9	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-001	M20W-TCN-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-011	M20W-TCN-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-021	M20W-TCN-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-026	M21D-TCN-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	335.4		Cyanide	Cyanide, Total	57-12-5	10	0.9	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-028	M21D-TCN-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	335.4		Cyanide	Cyanide, Total	57-12-5	10	0.9	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-030	M21D-TCN-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	335.4		Cyanide	Cyanide, Total	57-12-5	10	0.9	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106803-001	M21R-CYA-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	335.4		Cyanide	Cyanide, Total	57-12-5	10	0.9	9	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108797-002	M21W-TCN-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	10	0.5	2	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108797-004	M21W-TCN-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	10	0.5	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108797-006	M21W-TCN-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	10	0.5	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206848-002	M22D-TCN-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	0.0011	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206848-004	M22D-TCN-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	0.0009	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206848-006	M22D-TCN-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	0.0008	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209256-002	M22W-TCN-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	0.0009	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209256-004	M22W-TCN-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/10/2022	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209256-006	M22W-TCN-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	0.0008	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307215-002	M23D-TCN-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	0.0006	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307215-004	M23D-TCN-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	0.0006	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307215-006	M23D-TCN-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	0.0007	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307199-008	M23R-CYA-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	0.0062		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309290-002	M23W-TCN-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	0.002	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309290-004	M23W-TCN-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309290-006	M23W-TCN-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	SM 4500-CN- E		Cyanide	Cyanide, Total	57-12-5	5	0.5	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-014	MOA15TCN009	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	4.7	0.9	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-026	MOA15TCN011	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	4.7	0.9	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-010	MOA15TCN013	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	4.7	0.9	1	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-011	MOA15TCN015	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	4.7	0.9	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-006	MOA15TCN017	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	4.7	0.9	2.9	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-016	MOA15TCN019	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	4.7	0.9	1.2	J	µg/L	Water	NA	1
2016	Soil Control Lab	6060767-01	MOA16CYA008	RecWater	Effluent	Final Effluent	SAMP	06/22/2016	EPA 335.2	Total	Cyanide	Cyanide, total	57-12-5	3	0.3	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-014	MOA16TCN002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	4.7	0.9	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-010	MOA16TCN004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	4.7	0.9	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-020	MOA16TCN006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	4.7	0.9	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-014	MOA16TCN008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	4.7	0.9	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-010	MOA16TCN010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	4.7	0.9	2.1	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-010	MOA16TCN012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	4.7	0.9	3	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-010	MOA17TCN002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	SM 4500-CN- E	Total	Cyanide	Cyanide, Total	57-12-5	4.7	0.9	7.1	J+	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-010	MOA17TCN004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	SM 4500-CN- E	Total	Cyanide	Cyanide, Total	57-12-5	4.7	0.9	6.2	J+	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-010	MOA17TCN006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	SM 4500-CN- E	Total	Cyanide	Cyanide, Total	57-12-5	4.7	0.9	7	J+	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-016	MOA17TCN008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	SM 4500-CN- E	Total	Cyanide	Cyanide, Total	57-12-5	4.7	0.9	6.2	J+	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-049	MOA17TCN010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	SM 4500-CN- E	Total	Cyanide	Cyanide, Total	57-12-5	2.7	0.9	ND	UB	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-059	MOA17TCN012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	SM 4500-CN- E	Total	Cyanide	Cyanide, Total	57-12-5	2.7	0.9	ND	UB	µg/L	Water	NA	1
2018	Soil Control Lab	8060931-01	MOA18CYA008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 335.2	Total	Cyanide	Cyanide, total	57-12-5	1	0.3	0.39	J	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2018	ALS Environmental - WA	K1806181-002	MOA18TCN002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	2.7	0.9	ND	UB	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-012	MOA18TCN004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	2.7	0.9	ND	UB	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-022	MOA18TCN006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	2.7	0.9	ND	UB	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-002	MOA18TCN008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	2.7	0.9	1	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-012	MOA18TCN010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	2.7	0.9	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-022	MOA18TCN012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	SM 4500-CN- E	Total	Cyanide	Cyanide, total	57-12-5	2.7	0.9	1.2	J	µg/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Cypermethrin	52315-07-8	NA	0.00183	0.0041		ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Dacthal	1861-32-1	NA	0.00012		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	DEET	134-62-3	NA	0.00144	3.65	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	DEET	134-62-3	8.94	NA	6360	D	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Dehydronifedipine	67035-22-7	NA	0.00129		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Dehydronifedipine	67035-22-7	0.298	NA	1.4		ng/L	Aqueous	NA	NA
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Delta-BHC	319-86-8	0.1	0.029	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Delta-BHC	319-86-8	0.1	0.03	ND	ND	µg/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Demeclocycline	127-33-3	NA	0.0197		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8141B		Pesticides	Demeton-O,S	8065-48-3	2.1	0.039	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8141B		Pesticides	Demeton-O,S	8065-48-3	2.2	0.041	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8141B		Pesticides	Demeton-O,S	8065-48-3	4	1.6	ND	ND	µg/L	Water	NA	2
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8141B		Pesticides	Demeton-O,S	8065-48-3	2.2	0.053	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8141B		Pesticides	Demeton-O,S	8065-48-3	2.1	0.34	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8141B		Pesticides	Demeton-O,S	8065-48-3	2.1	0.16	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-4	MOA18POP002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8141A		Pesticides	Demeton-O,S	8065-48-3	5.3	2.9	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-4	MOA18POP005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8141A		Pesticides	Demeton-O,S	8065-48-3	5.0	2.8	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1908294-003	M19W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	ALS SOP		Pesticides	Demeton-O,S	8065-48-3	0.15	0.027	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-003	M19D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	ALS SOP		Pesticides	Demeton-O,S	8065-48-3	0.15		ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-009	M20D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	ALS SOP		Pesticides	Demeton-O,S	8065-48-3	0.16	0.062	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-009	M20W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	ALS SOP		Pesticides	Demeton-O,S	8065-48-3	0.15	0.027	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-006	M21D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	ALS SOP		Pesticides	Demeton-O,S	8065-48-3	0.75	0.14	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2108795-006	M21W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	ALS SOP		Pesticides	Demeton-O,S	8065-48-3	0.15	0.027	0.038	J,H	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-004	M22D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	ALS SOP		Pesticides	Demeton-O,S	8065-48-3	0.15	0.027	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-004	M22W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	ALS SOP		Pesticides	Demeton-O,S	8065-48-3	0.15	0.027	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-004	M23D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	ALS SOP		Pesticides	Demeton-O,S	8065-48-3	0.15	0.027	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-004	M23W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	ALS SOP		Pesticides	Demeton-O,S	8065-48-3	0.15	0.027	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Desethylatrazine	6190-65-4	NA	0.00027		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Desmethyldiltiazem	42399-41-7	NA	0.00084	0.0836	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Desmethyldiltiazem	86408-45-9	0.149	NA	30.2		ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Desogestrel	54024-22-5	622	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Diazepam	439-14-5	0.499	NA	0.827		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Diazinon	333-41-5	NA	0.00235		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Diazinon-Oxon	962-58-3	NA	0.00354		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	10	0.41	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	10	0.41	ND	ND	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3		1.13605	6.6772		ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	20	0.82	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	11	0.44	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3		1.13605	ND	ND	ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	10	0.41	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	50	2.1	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3		1.13605	ND	ND	ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	25.8	7.74	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	50	15	ND	ND	µg/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3		1.13605	ND	ND	ng/L	Water	NA	1
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	99	30	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	498	150	ND	ND	ug/L	Water	NA	100
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3		1.14	ND	ND	ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	2	0.17	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	0.5	0.085	ND	ND	ug/L	Water	NA	5

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3		1.14	5.285		ng/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	3.8	1.5	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	4	2.9	ND	ND	ug/L	Water	NA	20
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3		1.14	ND	ND	ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	4.7	3.6	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	3.8	2.9	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3		1.14	ND	ND	ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	20	3.6	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3	8	1.5	ND	ND	ug/L	Water	NA	10
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzo(a,h)anthracene	53-70-3		1.14	ND	ND	ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Dibenzofuran	132-64-9		1.18948	47.852		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Dibenzofuran	132-64-9		1.18948	25.812		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Dibenzofuran	132-64-9		1.18948	9.2097	J	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Dibenzofuran	132-64-9		1.18948	54.917		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzofuran	132-64-9		1.19	28.024		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzofuran	132-64-9		1.19	46.312		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzofuran	132-64-9		1.19	69.756		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzofuran	132-64-9		1.19	35.299		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzofuran	132-64-9		1.19	43.457		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Dibenzothiophene	132-65-0		0.82417	27.364		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Dibenzothiophene	132-65-0		0.82417	20.117		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Dibenzothiophene	132-65-0		0.82417	22.449		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Dibenzothiophene	132-65-0		0.82417	33.485		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzothiophene	132-65-0		0.82	20.634		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzothiophene	132-65-0		0.82	28.099		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzothiophene	132-65-0		0.82	32.51		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzothiophene	132-65-0		0.82	18.166		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Dibenzothiophene	132-65-0		0.82	22.747		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Dibromochloromethane	124-48-1	0.5	0.081	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Dibromochloromethane	124-48-1	0.5	0.081	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Dibromochloromethane	124-48-1	0.5	0.081	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Dibromochloromethane	124-48-1	0.5	0.081	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Dibromochloromethane	124-48-1	0.5	0.081	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Dibromochloromethane	124-48-1	0.5	0.081	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Dibromochloromethane	124-48-1	5	1.05	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Dibromochloromethane	124-48-1	1	0.21	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Dibromochloromethane	124-48-1	5	1.05	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Dibromochloromethane	124-48-1	5	1.05	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Dibromochloromethane	124-48-1	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Dibromochloromethane	124-48-1	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Dibromochloromethane	124-48-1	0.5	0.2	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Dibromochloromethane	124-48-1	5	0.2	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Dibromochloromethane	124-48-1	0.5	0.2	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Dibromochloromethane	124-48-1	0.5	0.2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Dibromochloromethane	124-48-1	0.5	0.2	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Dibromochloromethane	124-48-1	5	0.2	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	0.5	0.077	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	0.5	0.077	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	0.5	0.039	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	0.5	0.039	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	0.5	0.039	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	0.5	0.039	ND	ND	µg/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	0.5	0.1	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	5	0.1	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	0.5	0.1	ND	ND	ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	0.5	0.1	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	0.5	0.1	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Dichlorodifluoromethane (CFC 12)	75-71-8	5	0.1	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	2	0.14	2.9		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	2	0.14	0.88	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	2	0.06	2.2	J+	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	2	0.06	2.1	J+	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	2	0.06	3.1		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	2	0.06	4	J+	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	25	1.05	1.05	J	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	5	0.21	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	25	1.05	6.85	J	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	25	1.05	3.25	J	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	2	0.01	ND	UB	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	2	0.01	2.8		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	5	0.3	3	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	2	0.3	5.2		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	2	0.3	0.99	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	2	0.3	0.39	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	2	0.3	1.9	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Dichloromethane (Methylene Chlorid	75-09-2	5	0.3	1.4	J	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Dieldrin	60-57-1	0.011	0.00036	ND	UB	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Dieldrin	60-57-1	0.011	0.00037	0.0088	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Dieldrin	60-57-1	0.01	0.0065	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Dieldrin	60-57-1	0.011	0.00036	0.014		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Dieldrin	60-57-1	0.01	0.0017	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Dieldrin	60-57-1	0.01	0.0017	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Dieldrin	60-57-1	0.1	0.029	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Dieldrin	60-57-1	0.1	0.03	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Dieldrin	60-57-1	0.02	0.02	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Dieldrin	60-57-1	0.025	0.0058	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Dieldrin	60-57-1	0.0055	0.0055	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Dieldrin	60-57-1	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Dieldrin	60-57-1	0.048	0.0044	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Dieldrin	60-57-1	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Dieldrin	60-57-1	0.005	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Dieldrin	60-57-1	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Dieldrin	60-57-1	0.03	0.03	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Dieldrin	60-57-1	0.005	0.005	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Diethyl Phthalate	84-66-2	10	0.33	2.8	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Diethyl Phthalate	84-66-2	10	0.33	2.9	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Diethyl Phthalate	84-66-2	20	0.66	3.3	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Diethyl Phthalate	84-66-2	11	0.36	2.4	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Diethyl Phthalate	84-66-2	10	0.33	2.2	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Diethyl Phthalate	84-66-2	50	1.7	3.7	J	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Diethyl Phthalate	84-66-2	25.8	8.77	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Diethyl Phthalate	84-66-2	50	17	ND	ND	µg/L	Water	NA	10
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Diethyl Phthalate	84-66-2	99	34	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Diethyl Phthalate	84-66-2	498	170	ND	ND	ug/L	Water	NA	100
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Diethyl Phthalate	84-66-2	2	0.15	1.9	J	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Diethyl Phthalate	84-66-2	0.5	0.075	1.9		ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Diethyl Phthalate	84-66-2	3.8	0.65	2.1	J	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Diethyl Phthalate	84-66-2	4	1.3	1.5	J	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Diethyl Phthalate	84-66-2	3.8	1.3	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Diethyl Phthalate	84-66-2	4.7	1.7	2.1	J	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Diethyl Phthalate	84-66-2	20	1.7	2.6	J	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Diethyl Phthalate	84-66-2	8	0.65	3	J	ug/L	Water	NA	10

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Digoxigenin	1672-46-4	NA	0.159		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Digoxigenin	1672-46-4	1.99	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Digoxin	20830-75-5	NA	0.0108	0.0701		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Digoxin	20830-75-5	7.64	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Diltiazem	42399-41-7	NA	0.00052	0.406		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Diltiazem	42399-41-7	0.149	NA	96.1		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Dimethoate	60-51-5	NA	0.023		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	10	0.71	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	10	0.71	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	20	1.5	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	11	0.76	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	10	0.71	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	50	3.6	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	25.8	6.71	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	2	0.21	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	0.5	0.11	0.12	J	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	3.8	0.68	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	4	1.4	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	4.7	1.7	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	3.8	1.4	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	20	1.7	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Dimethyl Phthalate	131-11-3	8	0.68	ND	ND	ug/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	10	0.46	0.64	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	20	0.92	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	11	0.49	0.84	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	10	0.46	0.56	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	50	2.3	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	25.8	11.4	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	50	22	ND	ND	µg/L	Water	NA	10
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	99	44	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	498	220	ND	ND	ug/L	Water	NA	100
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	2	0.23	0.8	J	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	0.5	0.12	0.36	J	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	7.3	7.3	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	15	15	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	19	19	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	15	15	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	20	19	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Di-n-butyl Phthalate	84-74-2	8	7.3	ND	ND	ug/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	10	0.38	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	10	0.38	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	20	0.76	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	11	0.41	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	10	0.38	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	50	1.9	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	25.8	14.5	18.9	J	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	2	0.33	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	0.5	0.17	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	10	2.7	ND	ND	ug/L	Water	NA	20
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	3.8	1.4	1.5	J	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	4.7	3.3	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	3.8	2.7	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	20	3.3	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Di-n-octyl Phthalate	117-84-0	8	1.4	ND	ND	ug/L	Water	NA	10
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Diphenhydramine	58-73-1	NA	0.00058	1.68		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Diphenhydramine	58-73-1	0.596	NA	593		ng/L	Aqueous	NA	NA

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2019	ALS Environmental - WA	K1905862-007	M19D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.601		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-012	M19D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.549		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-022	M19D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.583		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-002	M19W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.581		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-007	M19W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.615		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-017	M19W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.51		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-002	M20D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.685		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-017	M20D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.499		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-027	M20D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.497		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-002	M20W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.538		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-012	M20W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.601		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-022	M20W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.579		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-004	M21D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.535		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-012	M21D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.466		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-020	M21D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.553		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-004	M21W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.522		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-012	M21W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.6		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-020	M21W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.567		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-004	M22D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.554		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-012	M22D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.5		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-020	M22D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.512		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-004	M22W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.654		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-012	M22W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.547		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-020	M22W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.484		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-002	M23D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.806		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-004	M23D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.612		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-006	M23D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.783		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-004	M23W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.628		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-012	M23W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.541		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-020	M23W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.675		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-008DISS	MOA15DML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.47		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-020DISS	MOA15DML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.5		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-004DISS	MOA15DML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.54		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-008DISS	MOA15DML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.5		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-004	MOA15DML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.01	0.448		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-014	MOA15DML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.01	0.522		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-008	MOA16DML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.01	0.477		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-004	MOA16DML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.01	0.57		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-014	MOA16DML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.01	0.472		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-008	MOA16DML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.006	0.605		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-004	MOA16DML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.006	0.524		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-004	MOA16DML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.006	0.489		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-004	MOA17DML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.006	0.608		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-004	MOA17DML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.006	0.536		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-004	MOA17DML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.006	0.577		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-010	MOA17DML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.006	0.521		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-043	MOA17DML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.006	0.458		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-053	MOA17DML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.006	0.504		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-006	MOA18DML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.642		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-016	MOA18DML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.564		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-026	MOA18DML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.564		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-006	MOA18DML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.59		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-016	MOA18DML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.693		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-026	MOA18DML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Dissolved	Metals	Antimony	7440-36-0	0.05	0.02	0.583		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-007	M19D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.39		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-012	M19D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.49		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-022	M19D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.56		ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2019	Brooks Applied Labs	1925069-17	M19R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1640 RP	Dissolved	Metals	Arsenic	7440-38-2	0.1	0.034	0.94	H	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-002	M19W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.74		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-007	M19W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.35		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-017	M19W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.58		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-002	M20D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.25		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-017	M20D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.25		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-027	M20D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.21		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-01RE1	M20R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Dissolved	Metals	Arsenic	7440-38-2	0.1	0.044	0.596		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-002	M20W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.31		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-012	M20W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.42		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-022	M20W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.16		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-004	M21D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.02		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-012	M21D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.05		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-020	M21D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.03		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-17	M21R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Dissolved	Metals	Arsenic	7440-38-2	0.1	0.044	1.07		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-004	M21W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.14		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-012	M21W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.33		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-020	M21W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.38		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-004	M22D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.26		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-012	M22D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.18		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-020	M22D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	1.98		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-31	M22R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Dissolved	Metals	Arsenic	7440-38-2	0.72	0.16	1.97		ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209249-004	M22W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.58		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-012	M22W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.6		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-020	M22W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.56		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-002	M23D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.08		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-004	M23D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.07		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-006	M23D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.08		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-17	M23R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1638M	Dissolved	Metals	Arsenic	7440-38-2	0.721	0.16	1.7		ug/L	Water	NA	10
2023	ALS Environmental - WA	K2309291-004	M23W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	1.93		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-012	M23W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.3		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-020	M23W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.73		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-008DISS	MOA15DML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.08	2.03		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-020DISS	MOA15DML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.08	2.06		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-004DISS	MOA15DML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.08	2.27		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-008DISS	MOA15DML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.08	2.24		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-004	MOA15DML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.05	1.97		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-014	MOA15DML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.05	2.13		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-008	MOA16DML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.05	2.5		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-004	MOA16DML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.05	2.72		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-014	MOA16DML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.05	2.46		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-008	MOA16DML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.2	2.53		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-004	MOA16DML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.2	2.69		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-004	MOA16DML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.2	2.37		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-21	MOA16DMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Dissolved	Metals	Arsenic	7440-38-2	0.1	0.034	0.893		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-004	MOA17DML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.2	2		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-004	MOA17DML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.2	2.02		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-004	MOA17DML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.2	1.98		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-010	MOA17DML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.2	2.03		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-043	MOA17DML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.2	2.02		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-053	MOA17DML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.2	1.98		µg/L	Water	NA	1
2017	Brooks Applied Labs	1738027-17	MOA17DMT018	RecWater	Effluent	Final Effluent	SAMP	09/19/2017	EPA 1640 RP	Dissolved	Metals	Arsenic	7440-38-2	0.1	0.034	1.17		µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-18	MOA17TMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Dissolved	Metals	Arsenic	7440-38-2	0.1	0.034	1.06		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-006	MOA18DML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.22		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-016	MOA18DML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.42		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-026	MOA18DML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.09	2.78		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-006	MOA18DML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.08	2.38		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2018	ALS Environmental - WA	K1808088-016	MOA18DML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.08	2.23		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-026	MOA18DML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Dissolved	Metals	Arsenic	7440-38-2	0.5	0.08	2.64		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-15RE1	MOA18DMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Dissolved	Metals	Arsenic	7440-38-2	0.1	0.034	0.891		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-007	M19D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-012	M19D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-022	M19D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-002	M19W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-007	M19W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-017	M19W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-002	M20D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-017	M20D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-027	M20D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-002	M20W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-012	M20W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-022	M20W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-004	M21D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-012	M21D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-020	M21D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-004	M21W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-012	M21W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-020	M21W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-004	M22D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-012	M22D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-020	M22D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-004	M22W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-012	M22W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-020	M22W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-002	M23D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-004	M23D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-006	M23D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-004	M23W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-012	M23W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-020	M23W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-008DISS	MOA15DML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.002	0.003	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-020DISS	MOA15DML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.002	0.002	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-004DISS	MOA15DML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.002	0.004	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-008DISS	MOA15DML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.002	0.003	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-004	MOA15DML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.008	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-014	MOA15DML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.008	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-008	MOA16DML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.008	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-004	MOA16DML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.008	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-014	MOA16DML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.008	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-008	MOA16DML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-004	MOA16DML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-004	MOA16DML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-004	MOA17DML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-004	MOA17DML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-004	MOA17DML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-010	MOA17DML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-043	MOA17DML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-053	MOA17DML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.006	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-006	MOA18DML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-016	MOA18DML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-026	MOA18DML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.005	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-006	MOA18DML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.002	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-016	MOA18DML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.002	0.003	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-026	MOA18DML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Dissolved	Metals	Beryllium	7440-41-7	0.02	0.002	ND	ND	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2019	ALS Environmental - WA	K1905862-007	M19D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.14		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-012	M19D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.134		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-022	M19D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.18		ug/L	Water	NA	1
2019	Brooks Applied Labs	1925069-17	M19R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1640 RP	Dissolved	Metals	Cadmium	7440-43-9	0.012	0.004	0.066	H	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-002	M19W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.126		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-007	M19W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.093		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-017	M19W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.085		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-002	M20D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.103		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-017	M20D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.096		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-027	M20D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.098		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-01RE1	M20R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Dissolved	Metals	Cadmium	7440-43-9	0.012	0.004	0.069		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-002	M20W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.091		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-012	M20W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.113		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-022	M20W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.084		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-004	M21D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.102		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-012	M21D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.106		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-020	M21D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.111		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-17RE1	M21R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Dissolved	Metals	Cadmium	7440-43-9	0.012	0.004	0.077		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-004	M21W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.1		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-012	M21W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.144		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-020	M21W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.123		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-004	M22D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.1		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-012	M22D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.091		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-020	M22D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.085		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-31	M22R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Dissolved	Metals	Cadmium	7440-43-9	0.18	0.06	0.129	J	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209249-004	M22W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.093		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-012	M22W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.042		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-020	M22W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.062		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-002	M23D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.124		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-004	M23D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.076		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-006	M23D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.114		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-17	M23R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1640 Column	Dissolved	Metals	Cadmium	7440-43-9	0.01	0.001	0.0785		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-004	M23W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.065		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-012	M23W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.064		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-020	M23W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.008	0.055		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-008DISS	MOA15DML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.009	0.11		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-020DISS	MOA15DML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.009	0.158		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-004DISS	MOA15DML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.009	0.172		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-008DISS	MOA15DML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.009	0.147		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-004	MOA15DML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.005	0.128		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-014	MOA15DML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.005	0.202		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-008	MOA16DML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.005	0.208		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-004	MOA16DML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.005	0.114		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-014	MOA16DML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.005	0.107		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-008	MOA16DML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.007	0.137		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-004	MOA16DML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.007	0.142		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-004	MOA16DML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.007	0.148		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-21	MOA16DMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Dissolved	Metals	Cadmium	7440-43-9	0.012	0.004	0.121		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-004	MOA17DML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.007	0.08		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-004	MOA17DML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.007	0.096		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-004	MOA17DML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.007	0.114		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-010	MOA17DML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.007	0.086		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-043	MOA17DML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.007	0.077		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-053	MOA17DML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.007	0.096		µg/L	Water	NA	1
2017	Brooks Applied Labs	1738027-17	MOA17DMT018	RecWater	Effluent	Final Effluent	SAMP	09/19/2017	ICP-MS	Dissolved	Metals	Cadmium	7440-43-9	0.008	0.002	0.06		µg/L	Water	NA	2
2017	Brooks Applied Labs	1723032-18RE1	MOA17TMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Dissolved	Metals	Cadmium	7440-43-9	0.012	0.004	0.056	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-006	MOA18DML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.006	0.128		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2018	ALS Environmental - WA	K1806181-016	MOA18DML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.006	0.138		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-026	MOA18DML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.006	0.21		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-006	MOA18DML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.009	0.157		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-016	MOA18DML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.009	0.099		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-026	MOA18DML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Dissolved	Metals	Cadmium	7440-43-9	0.02	0.009	0.132		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-15RE1	MOA18DMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Dissolved	Metals	Cadmium	7440-43-9	0.012	0.004	0.073		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-007	M19D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.92		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-012	M19D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.82		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-022	M19D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.86		ug/L	Water	NA	1
2019	Brooks Applied Labs	1925069-17	M19R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1640 RP	Dissolved	Metals	Chromium	7440-47-3	0.1	0.04	0.329	H	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-002	M19W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.66		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-007	M19W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.57		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-017	M19W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.63		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-002	M20D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.81		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-017	M20D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.83		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-027	M20D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	3.63		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-01RE1	M20R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Dissolved	Metals	Chromium	7440-47-3	0.1	0.04	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-002	M20W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.89		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-012	M20W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.93		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-022	M20W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.91		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-004	M21D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.83		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-012	M21D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.63		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-020	M21D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.79		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-17	M21R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Dissolved	Metals	Chromium	7440-47-3	0.1	0.04	0.361		µg/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-004	M21W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.66		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-012	M21W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.9		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-020	M21W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.93		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-004	M22D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.03		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-012	M22D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.03		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-020	M22D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.91		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-31	M22R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Dissolved	Metals	Chromium	7440-47-3	6	1.7	2.35	J	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209249-004	M22W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-012	M22W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.83		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-020	M22W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.94		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-002	M23D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.07		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-004	M23D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.85		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-006	M23D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.91		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-17	M23R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1638M	Dissolved	Metals	Chromium	7440-47-3	6.01	1.7	ND	ND	ug/L	Water	NA	10
2023	ALS Environmental - WA	K2309291-004	M23W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.71		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-012	M23W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.66		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-020	M23W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.55		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-008DISS	MOA15DML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.38		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-020DISS	MOA15DML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.23		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-004DISS	MOA15DML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.35		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-008DISS	MOA15DML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.75		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-004	MOA15DML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.02	0.95		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-014	MOA15DML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.02	1.42		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-008	MOA16DML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.02	1.39		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-004	MOA16DML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.02	1.16		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-014	MOA16DML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.02	1.05		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-008	MOA16DML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.34		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-004	MOA16DML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.27		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-004	MOA16DML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.04		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-21	MOA16DMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Dissolved	Metals	Chromium	7440-47-3	0.038	0.019	1.55	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-004	MOA17DML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.59		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-004	MOA17DML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.56		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-004	MOA17DML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.64		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2017	ALS Environmental - WA	K1708356-010	MOA17DML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.01		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-043	MOA17DML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.29		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-053	MOA17DML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.23		µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-18RE1	MOA17TMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Dissolved	Metals	Chromium	7440-47-3	0.1	0.04	0.523		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-006	MOA18DML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.02		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-016	MOA18DML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.01		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-026	MOA18DML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	1.48		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-006	MOA18DML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.95		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-016	MOA18DML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.69		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-026	MOA18DML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Dissolved	Metals	Chromium	7440-47-3	0.2	0.03	0.82		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-15RE3	MOA18DMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Dissolved	Metals	Chromium	7440-47-3	0.118	0.047	0.24		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-007	M19D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	36.3		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-012	M19D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	34.5		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-022	M19D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	41.8		ug/L	Water	NA	1
2019	Brooks Applied Labs	1925069-17	M19R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1640 RP	Dissolved	Metals	Copper	7440-50-8	0.07	0.03	14.9	H	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-002	M19W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	20.8		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-007	M19W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	19.7		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-017	M19W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	19.3		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-002	M20D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	15.6		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-017	M20D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	17.8		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-027	M20D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	23.1		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-01	M20R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Dissolved	Metals	Copper	7440-50-8	0.07	0.03	4.86		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-002	M20W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	17.9		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-012	M20W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	21.2		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-022	M20W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	25.4		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-004	M21D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	17		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-012	M21D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	19.5		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-020	M21D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	17		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-17	M21R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	12.7		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-004	M21W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	19.6		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-012	M21W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	21.8		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-020	M21W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	21.1		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-004	M22D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	24.1		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-012	M22D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	16		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-020	M22D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	15.9		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-31	M22R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Dissolved	Metals	Copper	7440-50-8	1	0.5	23.2		ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209249-004	M22W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	15.6		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-012	M22W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	9.78		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-020	M22W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	12.5		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-002	M23D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	25.6		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-004	M23D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	24.2		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-006	M23D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	24.4		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-17	M23R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1640 Column	Dissolved	Metals	Copper	7440-50-8	0.054	0.018	16.2		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-004	M23W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	20.9		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-012	M23W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	18.2		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-020	M23W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.05	11.8		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-008DISS	MOA15DML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	27.5		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-020DISS	MOA15DML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	29.9		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-004DISS	MOA15DML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	36.9		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-008DISS	MOA15DML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	21.7		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-004	MOA15DML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.03	20.7		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-014	MOA15DML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.03	30.7		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-008	MOA16DML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.03	24.6		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-004	MOA16DML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.03	24.2		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-014	MOA16DML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.03	22.9		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-008	MOA16DML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	19.2		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-004	MOA16DML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	16.5		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2016	ALS Environmental - WA	K1609311-004	MOA16DML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	12.7		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-21	MOA16DMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Dissolved	Metals	Copper	7440-50-8	0.07	0.03	10.6	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-004	MOA17DML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	21.7		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-004	MOA17DML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	22.8		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-004	MOA17DML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	22.9		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-010	MOA17DML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	15.2		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-043	MOA17DML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	20.3		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-053	MOA17DML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	21.4		µg/L	Water	NA	1
2017	Brooks Applied Labs	1738027-17	MOA17DMT018	RecWater	Effluent	Final Effluent	SAMP	09/19/2017	EPA 1640 RP	Dissolved	Metals	Copper	7440-50-8	0.07	0.03	6.28		µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-18	MOA17TMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Dissolved	Metals	Copper	7440-50-8	0.07	0.03	6.7		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-006	MOA18DML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.04	23.7		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-016	MOA18DML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.04	24.1		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-026	MOA18DML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.04	35.5		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-006	MOA18DML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	22.8		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-016	MOA18DML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	17		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-026	MOA18DML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Dissolved	Metals	Copper	7440-50-8	0.1	0.02	19.4		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-15RE1	MOA18DMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Dissolved	Metals	Copper	7440-50-8	0.11	0.03	7.58		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-007	M19D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	1.19		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-012	M19D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.982		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-022	M19D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	1.54		ug/L	Water	NA	1
2019	Brooks Applied Labs	1925069-17	M19R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1640 RP	Dissolved	Metals	Lead	7439-92-1	0.015	0.005	0.357	H	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-002	M19W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.782		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-007	M19W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.647		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-017	M19W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.524		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-002	M20D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.927		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-017	M20D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.606		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-027	M20D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.698		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-01RE1	M20R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Dissolved	Metals	Lead	7439-92-1	0.015	0.005	0.482		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-002	M20W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.548		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-012	M20W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.681		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-022	M20W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.578		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-004	M21D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.693		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-012	M21D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.552		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-020	M21D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.791		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-17	M21R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Dissolved	Metals	Lead	7439-92-1	0.015	0.005	0.824		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-004	M21W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.602		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-012	M21W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.845		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-020	M21W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.667		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-004	M22D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.812		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-012	M22D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.488		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-020	M22D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.365		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-31	M22R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Dissolved	Metals	Lead	7439-92-1	0.12	0.06	0.772		ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209249-004	M22W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.573		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-012	M22W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.332		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-020	M22W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.365		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-002	M23D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.711		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-004	M23D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.415		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-006	M23D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.006	0.539		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-17	M23R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1640 Column	Dissolved	Metals	Lead	7439-92-1	0.015	0.005	0.369		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-004	M23W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Dissolved	Metals	Lead	7439-92-1	0.04	0.006	0.443		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-012	M23W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Dissolved	Metals	Lead	7439-92-1	0.04	0.006	0.444		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-020	M23W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Dissolved	Metals	Lead	7439-92-1	0.04	0.006	0.398		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-008DISS	MOA15DML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.007	1.05		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-020DISS	MOA15DML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.007	1.02		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-004DISS	MOA15DML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.007	1.49		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-008DISS	MOA15DML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.007	0.663		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-004	MOA15DML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.002	0.689		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2015	ALS Environmental - WA	K1509400-014	MOA15DML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.002	1.33		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-008	MOA16DML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.002	1.03		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-004	MOA16DML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.002	0.798		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-014	MOA16DML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.002	0.604		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-008	MOA16DML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.004	1.01		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-004	MOA16DML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.004	0.965		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-004	MOA16DML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.004	1.04		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-21	MOA16DMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Dissolved	Metals	Lead	7439-92-1	0.013	0.006	1.15		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-004	MOA17DML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.004	0.432		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-004	MOA17DML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.004	0.394		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-004	MOA17DML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.004	1.39		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-010	MOA17DML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.004	0.319		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-043	MOA17DML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.004	0.406		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-053	MOA17DML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.004	0.47		µg/L	Water	NA	1
2017	Brooks Applied Labs	1738027-17	MOA17DMT018	RecWater	Effluent	Final Effluent	SAMP	09/19/2017	EPA 1640 RP	Dissolved	Metals	Lead	7439-92-1	0.015	0.005	0.268		µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-18	MOA17TMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Dissolved	Metals	Lead	7439-92-1	0.015	0.005	0.394		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-006	MOA18DML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.004	1.1		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-016	MOA18DML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.004	0.844		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-026	MOA18DML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.004	1.51		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-006	MOA18DML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.007	0.848		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-016	MOA18DML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.007	0.513		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-026	MOA18DML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Dissolved	Metals	Lead	7439-92-1	0.02	0.007	0.762		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-15RE1	MOA18DMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Dissolved	Metals	Lead	7439-92-1	0.015	0.005	0.177		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-009	M19D-DHG-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0192		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-014	M19D-DHG-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.014		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-024	M19D-DHG-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0184		ug/L	Water	NA	1
2019	Brooks Applied Labs	1925069-19	M19R-HGD-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0004	0.00013	0.0059	H	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-004	M19W-DHG-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0147		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-009	M19W-DHG-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0069		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-019	M19W-DHG-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0141		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-004	M20D-DHG-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0112		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-019	M20D-DHG-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.011		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-029	M20D-DHG-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0126		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-03RE1	M20R-HGD-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0063	0.00205	ND	ND	ug/L	Water	NA	16
2020	ALS Environmental - WA	K2006972-004	M20W-DHG-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0094		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-014	M20W-DHG-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0115		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-024	M20W-DHG-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0129		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-002	M21D-DHG-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0348		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-010	M21D-DHG-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0076		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-018	M21D-DHG-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0116		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-19	M21R-HGD-EF	RecWater	Effluent	Final Effluent	SAMP	06/09/2021	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0004	0.00013	0.0531		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-002	M21W-DHG-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0053		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-010	M21W-DHG-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0097		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-018	M21W-DHG-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0223		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-002	M22D-DHG-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.001		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-010	M22D-DHG-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0005		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-018	M22D-DHG-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0045		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-33RE1	M22R-HGD-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0004	0.00013	0.0024		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-002	M22W-DHG-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0087		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-010	M22W-DHG-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0052		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-018	M22W-DHG-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0062		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307204-002	M23D-DHG-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0106		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307204-004	M23D-DHG-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0092		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307204-006	M23D-DHG-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0083		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-19	M23R-HGD-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0004	0.00013	0.0067		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-002	M23W-DHG-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0085		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-010	M23W-DHG-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0067		ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	ALS Environmental - WA	K2309291-018	M23W-DHG-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0061		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-012	MOA15MCD002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0211		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-024	MOA15MCD004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0284		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-008	MOA15MCD006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0157		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-020	MOA15MCD008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0106		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-010	MOA15MCD010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0178		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-020	MOA15MCD012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0261		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-23	MOA16DHG008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0004	0.00011	0.02270		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-012	MOA16MCD002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0025	0.0003	0.029		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-008	MOA16MCD004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0025	0.0003	0.0237		µg/L	Water	NA	5
2016	ALS Environmental - WA	K1607065-018	MOA16MCD006	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0025	0.0003	0.0213		µg/L	Water	NA	5
2016	ALS Environmental - WA	K1609222-012	MOA16MCD008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0894		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-008	MOA16MCD010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.024		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-008	MOA16MCD012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0036		µg/L	Water	NA	1
2017	Brooks Applied Labs	1738027-18	MOA17DHG018	RecWater	Effluent	Final Effluent	SAMP	09/19/2017	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0004	0.0001	0.004		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-008	MOA17MCD002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.00470		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-008	MOA17MCD004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0054		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-008	MOA17MCD006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.00577		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-014	MOA17MCD008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.00537		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-047	MOA17MCD010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.00722		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-057	MOA17MCD012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.00670		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-17	MOA18DHG008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1631 E	Dissolved	Metals	Mercury	7439-97-6	0.0004	0.00013	0.0053		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-010	MOA18MCD002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.01850		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-020	MOA18MCD004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.01920		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-030	MOA18MCD006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.01720		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-010	MOA18MCD008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.01990		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-020	MOA18MCD010	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.01070		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-030	MOA18MCD012	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	1631E	Dissolved	Metals	Mercury	7439-97-6	0.0005	0.00006	0.01640		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-007	M19D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	2.72		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-012	M19D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	3.91		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-022	M19D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	2.22		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-002	M19W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.75		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-007	M19W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	47.6		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-017	M19W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	7.1		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-002	M20D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	6.76		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-017	M20D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	3.21		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-027	M20D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	5.56		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-002	M20W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.5		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-012	M20W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	2.19		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-022	M20W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.75		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-004	M21D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.59		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-012	M21D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.85		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-020	M21D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.81		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-004	M21W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.33		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-012	M21W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	4.18		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-020	M21W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	3.75		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-004	M22D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.85		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-012	M22D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.68		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-020	M22D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	2.44		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-004	M22W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.75		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-012	M22W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.5		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-020	M22W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.74		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-002	M23D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	5.03		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-004	M23D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	3.24		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-006	M23D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.73		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-004	M23W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.34		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-012	M23W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	1.52		ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	ALS Environmental - WA	K2309291-020	M23W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	2.15		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-008DISS	MOA15DML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.01	4.28		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-020DISS	MOA15DML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.01	3.77		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-004DISS	MOA15DML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.01	2.83		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-008DISS	MOA15DML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.01	2.2		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-004	MOA15DML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.008	4.37		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-014	MOA15DML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.008	4.78		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-008	MOA16DML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.008	2.99		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-004	MOA16DML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.008	7		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-014	MOA16DML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.008	3.93		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-008	MOA16DML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.02	2.5		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-004	MOA16DML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.02	3.02		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-004	MOA16DML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.02	4.07		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-004	MOA17DML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.02	4.99		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-004	MOA17DML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.02	3.05		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-004	MOA17DML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.02	2.72		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-010	MOA17DML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.02	5.09		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-043	MOA17DML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.02	1.68		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-053	MOA17DML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.05	0.02	4.01		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-006	MOA18DML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	4.59		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-016	MOA18DML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	3.24		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-026	MOA18DML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.03	2.18		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-006	MOA18DML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.006	2.22		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-016	MOA18DML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.006	6.16		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-026	MOA18DML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Dissolved	Metals	Molybdenum	7439-98-7	0.1	0.006	3.68		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-007	M19D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	6.29		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-012	M19D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	5.45		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-022	M19D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.84		ug/L	Water	NA	1
2019	Brooks Applied Labs	1925069-17	M19R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1640 RP	Dissolved	Metals	Nickel	7440-02-0	0.14	0.04	1.43	H	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-002	M19W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.72		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-007	M19W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.76		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-017	M19W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.9		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-002	M20D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.74		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-017	M20D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.73		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-027	M20D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	5.93		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-01RE1	M20R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Dissolved	Metals	Nickel	7440-02-0	0.14	0.04	0.136	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-002	M20W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.86		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-012	M20W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.93		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-022	M20W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	5.03		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-004	M21D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	9.49		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-012	M21D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.44		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-020	M21D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.47		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-17	M21R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Dissolved	Metals	Nickel	7440-02-0	0.14	0.04	0.784	J-	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-004	M21W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.24		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-012	M21W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.72		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-020	M21W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.71		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-004	M22D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.24		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-012	M22D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.32		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-020	M22D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.76		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-31	M22R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Dissolved	Metals	Nickel	7440-02-0	3.6	1.2	2.88	J	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209249-004	M22W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.88		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-012	M22W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.9		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-020	M22W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.38		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-002	M23D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.46		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-004	M23D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.12		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-006	M23D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.72		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-17	M23R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1640 Column	Dissolved	Metals	Nickel	7440-02-0	0.144	0.048	2.06		ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	ALS Environmental - WA	K2309291-004	M23W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.83		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-012	M23W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.53		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-020	M23W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.85		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-008DISS	MOA15DML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.44		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-020DISS	MOA15DML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.37		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-004DISS	MOA15DML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.94		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-008DISS	MOA15DML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	2.65		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-004	MOA15DML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.79		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-014	MOA15DML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.8		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-008	MOA16DML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.33		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-004	MOA16DML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.64		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-014	MOA16DML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.74		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-008	MOA16DML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.02	4.39		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-004	MOA16DML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.02	4.53		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-004	MOA16DML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.02	5.27		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-21	MOA16DMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Dissolved	Metals	Nickel	7440-02-0	0.14	0.04	1.41		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-004	MOA17DML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.02	4.41		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-004	MOA17DML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.02	3.47		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-004	MOA17DML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.02	3.67		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-010	MOA17DML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.02	4.18		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-043	MOA17DML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.02	4.49		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-053	MOA17DML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.02	4.73		µg/L	Water	NA	1
2017	Brooks Applied Labs	1738027-17	MOA17DMT018	RecWater	Effluent	Final Effluent	SAMP	09/19/2017	EPA 1640 RP	Dissolved	Metals	Nickel	7440-02-0	0.14	0.04	0.466	J+	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-006	MOA18DML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.39		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-016	MOA18DML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.42		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-026	MOA18DML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.6		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-006	MOA18DML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	4.08		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-016	MOA18DML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.65		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-026	MOA18DML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Dissolved	Metals	Nickel	7440-02-0	0.2	0.04	3.72		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-15RE3	MOA18DMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Dissolved	Metals	Nickel	7440-02-0	0.165	0.047	0.498		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-007	M19D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-012	M19D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-022	M19D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.8	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-002	M19W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-007	M19W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.5	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-017	M19W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.5	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-002	M20D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-017	M20D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-027	M20D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.5	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-002	M20W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-012	M20W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-022	M20W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.5	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-004	M21D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.5	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-012	M21D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.5	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-020	M21D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-004	M21W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-012	M21W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-020	M21W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-004	M22D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-012	M22D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-020	M22D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-004	M22W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.5	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-012	M22W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.4	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-020	M22W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.5	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-002	M23D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.5	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-004	M23D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	ALS Environmental - WA	K2307216-006	M23D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.5	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-004	M23W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.4	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-012	M23W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-020	M23W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-008DISS	MOA15DML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-020DISS	MOA15DML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.6	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-004DISS	MOA15DML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.7	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-008DISS	MOA15DML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.7	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-004	MOA15DML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	0.6	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-014	MOA15DML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	0.8	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-008	MOA16DML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	0.7	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-004	MOA16DML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	0.7	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-014	MOA16DML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	0.7	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-008	MOA16DML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	0.9	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-004	MOA16DML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	0.9	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-004	MOA16DML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	0.9	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-004	MOA17DML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	0.9	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-004	MOA17DML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	1		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-004	MOA17DML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	0.8	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-010	MOA17DML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	0.7	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-043	MOA17DML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	0.9	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-053	MOA17DML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.4	0.8	J	µg/L	Water	NA	1
2017	Brooks Applied Labs	1738027-17	MOA17DMT018	RecWater	Effluent	Final Effluent	SAMP	09/19/2017	EPA 1640 RP	Dissolved	Metals	Selenium	7782-49-2	0.25	0.083	0.136	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-006	MOA18DML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.7	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-016	MOA18DML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.8	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-026	MOA18DML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.9	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-006	MOA18DML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.8	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-016	MOA18DML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.5	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-026	MOA18DML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Dissolved	Metals	Selenium	7782-49-2	1	0.2	0.7	J	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-007	M19D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.213		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-012	M19D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.123		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-022	M19D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.231		ug/L	Water	NA	1
2019	Brooks Applied Labs	1925069-17	M19R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1640 RP	Dissolved	Metals	Silver	7440-22-4	0.05	0.017	ND	ND,H	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-002	M19W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.061		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-007	M19W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.064		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-017	M19W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.037		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-002	M20D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.193		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-017	M20D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.073	J+,B	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-027	M20D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.065	J+,B	ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-01RE1	M20R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Dissolved	Metals	Silver	7440-22-4	0.05	0.019	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-002	M20W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.065		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-012	M20W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.091		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-022	M20W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.058		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-004	M21D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.024		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-012	M21D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.023		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-020	M21D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.047		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-17	M21R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Dissolved	Metals	Silver	7440-22-4	0.05	0.019	0.023	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-004	M21W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.055		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-012	M21W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.084		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-020	M21W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.065		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-004	M22D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.056		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-012	M22D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.047		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-020	M22D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.055		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-31RE1	M22R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Dissolved	Metals	Silver	7440-22-4	0.15	0.05	0.082	J	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209249-004	M22W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.046		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-012	M22W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.024		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-020	M22W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.031		ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	ALS Environmental - WA	K2307216-002	M23D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.078		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-004	M23D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.039		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-006	M23D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.041		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-17	M23R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1638M	Dissolved	Metals	Silver	7440-22-4	0.15	0.05	ND	ND	ug/L	Water	NA	10
2023	ALS Environmental - WA	K2309291-004	M23W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.044		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-012	M23W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.032		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-020	M23W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.009	0.033		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-008DISS	MOA15DML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.002	0.27		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-020DISS	MOA15DML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.002	0.168		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-004DISS	MOA15DML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.002	0.297		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-008DISS	MOA15DML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.002	0.045		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-004	MOA15DML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.005	0.098		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-014	MOA15DML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.005	0.196		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-008	MOA16DML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.005	0.125		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-004	MOA16DML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.005	0.279		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-014	MOA16DML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.005	0.185		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-008	MOA16DML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.003	0.152		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-004	MOA16DML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.003	0.121		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-004	MOA16DML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.003	0.028		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-21	MOA16DMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Dissolved	Metals	Silver	7440-22-4	0.05	0.017	0.129		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-004	MOA17DML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.003	0.054		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-004	MOA17DML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.003	0.051		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-004	MOA17DML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.003	0.043		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-010	MOA17DML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.003	0.054		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-043	MOA17DML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.003	0.075		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-053	MOA17DML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.003	0.101		µg/L	Water	NA	1
2017	Brooks Applied Labs	1738027-17	MOA17DMT018	RecWater	Effluent	Final Effluent	SAMP	09/19/2017	EPA 1640 RP	Dissolved	Metals	Silver	7440-22-4	0.05	0.017	0.191		µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-18	MOA17TMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Dissolved	Metals	Silver	7440-22-4	0.05	0.017	0.07		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-006	MOA18DML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.008	0.368		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-016	MOA18DML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.008	0.292		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-026	MOA18DML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.008	0.422		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-006	MOA18DML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.002	0.145		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-016	MOA18DML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.002	0.077		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-026	MOA18DML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Dissolved	Metals	Silver	7440-22-4	0.02	0.002	0.178		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-15RE3	MOA18DMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Dissolved	Metals	Silver	7440-22-4	0.059	0.02	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-007	M19D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-012	M19D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-022	M19D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-002	M19W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	0.032		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-007	M19W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	0.024		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-017	M19W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-002	M20D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	0.016	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-017	M20D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-027	M20D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-002	M20W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-012	M20W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-022	M20W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-004	M21D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-012	M21D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-020	M21D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-004	M21W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-012	M21W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-020	M21W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-004	M22D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	0.013	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-012	M22D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-020	M22D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-004	M22W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2022	ALS Environmental - WA	K2209249-012	M22W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-020	M22W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-002	M23D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-004	M23D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-006	M23D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-004	M23W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-012	M23W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-020	M23W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-008DISS	MOA15DML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-020DISS	MOA15DML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-004DISS	MOA15DML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-008DISS	MOA15DML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-004	MOA15DML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-014	MOA15DML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-008	MOA16DML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-004	MOA16DML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-014	MOA16DML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-008	MOA16DML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-004	MOA16DML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-004	MOA16DML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-004	MOA17DML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-004	MOA17DML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-004	MOA17DML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-010	MOA17DML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-043	MOA17DML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	UB	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-053	MOA17DML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-006	MOA18DML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-016	MOA18DML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-026	MOA18DML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-006	MOA18DML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-016	MOA18DML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-026	MOA18DML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Dissolved	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-007	M19D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	104		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-012	M19D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	101		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-022	M19D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	124		ug/L	Water	NA	1
2019	Brooks Applied Labs	1925069-17RE1	M19R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1640 RP	Dissolved	Metals	Zinc	7440-66-6	3.75	1.3	29.9	H	ug/L	Water	NA	5
2019	ALS Environmental - WA	K1909781-002	M19W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	73.5		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-007	M19W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	64.8		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-017	M19W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	64.9		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-002	M20D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	68		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-017	M20D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	70.4		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-027	M20D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	82.8		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-01RE1	M20R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Dissolved	Metals	Zinc	7440-66-6	0.75	0.35	16.8		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-002	M20W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	62.5		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-012	M20W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	75.1		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-022	M20W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	82.1		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-004	M21D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	66		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-012	M21D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	60.6		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-020	M21D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	69.2		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-17	M21R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Dissolved	Metals	Zinc	7440-66-6	1.2	0.6	32.3		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-004	M21W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	54.4		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-012	M21W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	72		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-020	M21W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	71.9		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-004	M22D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	81		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-012	M22D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	71.8		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-020	M22D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	80.3		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-31	M22R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Dissolved	Metals	Zinc	7440-66-6	22	7	53.5		ug/L	Water	NA	10

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2022	ALS Environmental - WA	K2209249-004	M22W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	52.4		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-012	M22W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	38.7		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-020	M22W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	44.4		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-002	M23D-DMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	84.7		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-004	M23D-DMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	75.4		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307216-006	M23D-DMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	96.4		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-17	M23R-MTD-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1640 Column	Dissolved	Metals	Zinc	7440-66-6	0.138	0.046	37.5		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-004	M23W-DMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	72.3		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-012	M23W-DMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	73		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-020	M23W-DMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.5	57		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-008DISS	MOA15DML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Dissolved	Metals	Zinc	7440-66-6	0.5	0.08	63.4		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-020DISS	MOA15DML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Dissolved	Metals	Zinc	7440-66-6	0.5	0.08	69.6		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-004DISS	MOA15DML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Dissolved	Metals	Zinc	7440-66-6	0.5	0.08	81		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-008DISS	MOA15DML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Dissolved	Metals	Zinc	7440-66-6	0.5	0.08	46.7		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-004	MOA15DML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Dissolved	Metals	Zinc	7440-66-6	0.5	0.09	54.6		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-014	MOA15DML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Dissolved	Metals	Zinc	7440-66-6	0.5	0.09	85.6		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-008	MOA16DML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Dissolved	Metals	Zinc	7440-66-6	0.5	0.09	66.1		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-004	MOA16DML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Dissolved	Metals	Zinc	7440-66-6	0.5	0.09	78.9		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-014	MOA16DML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Dissolved	Metals	Zinc	7440-66-6	0.5	0.09	61.2		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-008	MOA16DML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Dissolved	Metals	Zinc	7440-66-6	0.5	0.2	60.9		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-004	MOA16DML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Dissolved	Metals	Zinc	7440-66-6	0.5	0.2	63.3		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-004	MOA16DML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Dissolved	Metals	Zinc	7440-66-6	0.5	0.2	73.4		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-21RE1	MOA16DMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Dissolved	Metals	Zinc	7440-66-6	0.75	0.35	62		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-004	MOA17DML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.2	59.3		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-004	MOA17DML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.2	54.9		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-004	MOA17DML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.2	56.6		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-010	MOA17DML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.2	55.8		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-043	MOA17DML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.2	64.7		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-053	MOA17DML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.2	70.2		µg/L	Water	NA	1
2017	Brooks Applied Labs	1738027-17	MOA17DMT018	RecWater	Effluent	Final Effluent	SAMP	09/19/2017	EPA 1640 RP	Dissolved	Metals	Zinc	7440-66-6	0.75	0.35	34.6		µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-18RE1	MOA17TMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Dissolved	Metals	Zinc	7440-66-6	0.75	0.35	50.8		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-006	MOA18DML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.2	69.2		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-016	MOA18DML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.2	67.6		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-026	MOA18DML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.2	102		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-006	MOA18DML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.08	61.4		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-016	MOA18DML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.08	57.9		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-026	MOA18DML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Dissolved	Metals	Zinc	7440-66-6	2	0.08	67.1		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-15RE1	MOA18DMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Dissolved	Metals	Zinc	7440-66-6	0.75	0.35	33.1		µg/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Disulfoton	298-04-4	NA	0.00399		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Disulfoton Sulfone	218208	NA	0.00056		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Doxycycline	564-25-0	NA	0.0142	0.15		ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Enalapril	75847-73-3	NA	0.00087	0.0121	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Enalapril	75847-73-3	1.49	NA	5.95	D	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Endosulfan I	959-98-8	0.011	0.0057	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Endosulfan I	959-98-8	0.011	0.0032	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Endosulfan I	959-98-8	0.01	0.00044	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Endosulfan I	959-98-8	0.011	0.0068	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Endosulfan I	959-98-8	0.01	0.0031	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Endosulfan I	959-98-8	0.01	0.0031	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Endosulfan I	959-98-8	0.1	0.028	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Endosulfan I	959-98-8	0.1	0.029	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Endosulfan I	959-98-8	0.02	0.02	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Endosulfan I	959-98-8	0.025	0.0038	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Endosulfan I	959-98-8	0.0055	0.0055	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Endosulfan I	959-98-8	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Endosulfan I	959-98-8	0.048	0.0036	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Endosulfan I	959-98-8	0.048		ND	ND	ug/L	Water	NA	10

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Endosulfan I	959-98-8	0.005	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Endosulfan I	959-98-8	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Endosulfan I	959-98-8	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Endosulfan I	959-98-8	0.005	0.005	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Endosulfan II	33213-65-9	0.039	0.039	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Endosulfan II	33213-65-9	0.02	0.02	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Endosulfan II	33213-65-9	0.019	0.019	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Endosulfan II	33213-65-9	0.015	0.015	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Endosulfan II	33213-65-9	0.017	0.017	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Endosulfan II	33213-65-9	0.014	0.014	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Endosulfan II	33213-65-9	0.1	0.027	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Endosulfan II	33213-65-9	0.1	0.028	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Endosulfan II	33213-65-9	0.025	0.025	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Endosulfan II	33213-65-9	0.025	0.01	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Endosulfan II	33213-65-9	0.052	0.052	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Endosulfan II	33213-65-9	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Endosulfan II	33213-65-9	0.048	0.0034	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Endosulfan II	33213-65-9	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Endosulfan II	33213-65-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Endosulfan II	33213-65-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Endosulfan II	33213-65-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Endosulfan II	33213-65-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Endosulfan Sulfate	1031-07-8	0.011	0.00049	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Endosulfan Sulfate	1031-07-8	0.01	0.0064	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Endosulfan Sulfate	1031-07-8	0.011	0.0017	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Endosulfan Sulfate	1031-07-8	0.01	0.0048	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Endosulfan Sulfate	1031-07-8	0.01	0.0048	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Endosulfan Sulfate	1031-07-8	0.1	0.029	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Endosulfan Sulfate	1031-07-8	0.1	0.03	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Endosulfan Sulfate	1031-07-8	0.02	0.02	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Endosulfan Sulfate	1031-07-8	0.025	0.021	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Endosulfan Sulfate	1031-07-8	0.0055	0.0055	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Endosulfan Sulfate	1031-07-8	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Endosulfan Sulfate	1031-07-8	0.048	0.0047	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Endosulfan Sulfate	1031-07-8	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Endosulfan Sulfate	1031-07-8	0.005	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Endosulfan Sulfate	1031-07-8	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Endosulfan Sulfate	1031-07-8	0.0079	0.0079	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Endosulfan Sulfate	1031-07-8	0.005	0.005	0.022		ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Endosulphan Sulphate	1031-07-8	NA	0.00021		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Endrin	72-20-8	0.011	0.00071	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Endrin	72-20-8	0.011	0.00069	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Endrin	72-20-8	0.01	0.00068	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Endrin	72-20-8	0.011	0.0058	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Endrin	72-20-8	0.01	0.0023	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Endrin	72-20-8	0.01	0.0023	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Endrin	72-20-8	0.1	0.031	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Endrin	72-20-8	0.1	0.032	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Endrin	72-20-8	0.025	0.0068	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Endrin	72-20-8	0.02	0.02	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Endrin	72-20-8	0.0055	0.0055	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Endrin	72-20-8	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Endrin	72-20-8	0.048	0.0042	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Endrin	72-20-8	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Endrin	72-20-8	0.005	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Endrin	72-20-8	0.005	0.005	ND	ND	ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Endrin	72-20-8	0.013	0.013	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Endrin	72-20-8	0.005	0.005	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Endrin	72-20-8	NA	3.8E-05	6E-05		ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Endrin Aldehyde	7421-93-4	0.011	0.00048	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Endrin Aldehyde	7421-93-4	0.011	0.00047	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Endrin Aldehyde	7421-93-4	0.01	0.00046	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Endrin Aldehyde	7421-93-4	0.011	0.0047	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Endrin Aldehyde	7421-93-4	0.01	0.0067	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Endrin Aldehyde	7421-93-4	0.01	0.0073	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Endrin Aldehyde	7421-93-4	0.1	0.027	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Endrin Aldehyde	7421-93-4	0.1	0.028	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Endrin Aldehyde	7421-93-4	0.02	0.02	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Endrin Aldehyde	7421-93-4	0.025	0.0055	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Endrin Aldehyde	7421-93-4	0.0055	0.0055	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Endrin Aldehyde	7421-93-4	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Endrin Aldehyde	7421-93-4	0.048	0.0047	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Endrin Aldehyde	7421-93-4	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Endrin Aldehyde	7421-93-4	0.005	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Endrin Aldehyde	7421-93-4	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Endrin Aldehyde	7421-93-4	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Endrin Aldehyde	7421-93-4	0.005	0.005	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Endrin Ketone	53494-70-5	0.011	0.0077	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Endrin Ketone	53494-70-5	0.011	0.011	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Endrin Ketone	53494-70-5	0.019	0.019	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Endrin Ketone	53494-70-5	0.011	0.0049	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Endrin Ketone	53494-70-5	0.01	0.0063	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Endrin Ketone	53494-70-5	0.01	0.0063	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Endrin Ketone	53494-70-5	0.1	0.025	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Endrin Ketone	53494-70-5	0.1	0.025	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Endrin Ketone	53494-70-5	0.02	0.02	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Endrin Ketone	53494-70-5	0.025	0.007	0.0096	J	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Endrin Ketone	53494-70-5	0.0055	0.0055	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Endrin Ketone	53494-70-5	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Endrin Ketone	53494-70-5	0.048	0.007	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Endrin Ketone	53494-70-5	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Endrin Ketone	53494-70-5	0.005	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Endrin Ketone	53494-70-5	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Endrin Ketone	53494-70-5	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Endrin Ketone	53494-70-5	0.005	0.005	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Endrin Ketone	53494-70-5	NA	0.00015		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Enrofloxacin	93106-60-6	NA	0.003		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Enrofloxacin	93106-60-6	0.596	NA	0.708		ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Equilenin	517-09-9	0.538	NA	13.4		ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Equilin	474-86-2	2.04	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Erythromycin-H2O	114-07-8	NA	0.00029	0.168		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Erythromycin-H2O	114-07-8	1.49	NA	12	J	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Estriol	50-27-1	174	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Estrone	53-16-7	3.16	NA	33.1		ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	EtFOSAA	2991-50-6	1.36	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Ethion	563-12-2	NA	0.00107		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8141B		Pesticides	Ethyl Parathion	56-38-2	0.51	0.011	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8141B		Pesticides	Ethyl Parathion	56-38-2	0.54	0.011	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8141B		Pesticides	Ethyl Parathion	56-38-2	1	0.02	ND	ND	µg/L	Water	NA	2
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8141B		Pesticides	Ethyl Parathion	56-38-2	0.55	0.011	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8141B		Pesticides	Ethyl Parathion	56-38-2	0.53	0.039	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8141B		Pesticides	Ethyl Parathion	56-38-2	0.52	0.016	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1908294-003	M19W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	ALS SOP		Pesticides	Ethyl parathion	56-38-2	0.05	0.004	ND	ND	ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2019	ALS Environmental - WA	K1905790-003	M19D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	ALS SOP		Pesticides	Ethyl parathion	56-38-2	0.05		ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-009	M20D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	ALS SOP		Pesticides	Ethyl parathion	56-38-2	0.053	0.0043	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-009	M20W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	ALS SOP		Pesticides	Ethyl parathion	56-38-2	0.05	0.004	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-006	M21W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	ALS SOP		Pesticides	Ethyl parathion	56-38-2	0.05	0.004	ND	ND,H	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-006	M21D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	ALS SOP		Pesticides	Ethyl parathion	56-38-2	0.25	0.02	ND	ND	ug/L	Water	NA	5
2022	ALS Environmental - WA	K2206847-004	M22D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	ALS SOP		Pesticides	Ethyl parathion	56-38-2	0.05	0.004	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-004	M22W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	ALS SOP		Pesticides	Ethyl parathion	56-38-2	0.05	0.004	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-004	M23D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	ALS SOP		Pesticides	Ethyl parathion	56-38-2	0.05	0.004	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-004	M23W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	ALS SOP		Pesticides	Ethyl parathion	56-38-2	0.05	0.004	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.36	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506653-001	MOA15VOA008	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	624		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.35	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Ethylbenzene	100-41-4	0.5	0.03	1.4		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607039-001	MOA16VOA008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	624		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.54		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.58		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.47	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.63		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1706002-001	MOA17VOA008	RecWater	Effluent	Final Effluent	SAMP	06/06/2017	624		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.44	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.49	J	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Ethylbenzene	100-41-4	5	1.05	1.2	J	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Ethylbenzene	100-41-4	1	0.21	0.29	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806164-001	MOA18VOA008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 624		VOCs	Ethylbenzene	100-41-4	0.5	0.03	1.5		µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Ethylbenzene	100-41-4	5	1.05	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Ethylbenzene	100-41-4	5	1.05	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	K1905864-001	M19R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	EPA 624		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.48	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005387-010	M20R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	624.1		VOCs	Ethylbenzene	100-41-4	0.5	0.01	0.18	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Ethylbenzene	100-41-4	0.5	0.01	0.22	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Ethylbenzene	100-41-4	0.5	0.01	0.08	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106804-001	M21R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.17	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.19	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Ethylbenzene	100-41-4	5	0.03	0.16	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.17	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.55		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Ethylbenzene	100-41-4	0.5	0.03	0.32	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Ethylbenzene	100-41-4	5	0.03	0.76	J	ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Fenitrothion	122-14-5	NA	0.0021		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Flumequine	42835-25-6	NA	0.00352		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Flumequine	42835-25-6	0.298	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Fluocinonide	356-12-7	NA	0.006		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Fluocinonide	356-12-7	2	NA	ND	U	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Fluoranthene	206-44-0	10	0.45	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Fluoranthene	206-44-0	10	0.45	ND	ND	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Fluoranthene	206-44-0		1.09492	232.7		ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Fluoranthene	206-44-0	20	0.9	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Fluoranthene	206-44-0	11	0.48	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Fluoranthene	206-44-0		1.09492	130.34		ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Fluoranthene	206-44-0	10	0.45	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Fluoranthene	206-44-0	50	2.3	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Fluoranthene	206-44-0		1.09492	229.35		ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Fluoranthene	206-44-0	25.8	7.22	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Fluoranthene	206-44-0	50	14	ND	ND	µg/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Fluoranthene	206-44-0		1.09492	316.97		ng/L	Water	NA	1
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Fluoranthene	206-44-0	99	28	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Fluoranthene	206-44-0	498	140	ND	ND	ug/L	Water	NA	100
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Fluoranthene	206-44-0		1.09	130.6		ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Fluoranthene	206-44-0	2	0.2	0.26	J	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Fluoranthene	206-44-0	0.5	0.1	0.15	J	ug/L	Water	NA	5
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Fluoranthene	206-44-0		1.09	163.91		ng/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Fluoranthene	206-44-0	3.8	0.69	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Fluoranthene	206-44-0	4	1.4	ND	ND	ug/L	Water	NA	20
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Fluoranthene	206-44-0		1.09	171.74		ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Fluoranthene	206-44-0	4.7	1.8	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Fluoranthene	206-44-0	3.8	1.4	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Fluoranthene	206-44-0		1.09	111.74		ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Fluoranthene	206-44-0	20	1.8	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Fluoranthene	206-44-0	8	0.69	ND	ND	ug/L	Water	NA	10
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Fluoranthene	206-44-0		1.09	135.43		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Fluorene	86-73-7	10	0.23	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Fluorene	86-73-7	10	0.23	ND	ND	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Fluorene	86-73-7		0.81327	63.534		ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Fluorene	86-73-7	20	0.46	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Fluorene	86-73-7	11	0.25	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Fluorene	86-73-7		0.81327	45.502		ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Fluorene	86-73-7	10	0.23	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Fluorene	86-73-7	50	1.2	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Fluorene	86-73-7		0.81327	63.748		ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Fluorene	86-73-7	25.8	4.33	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Fluorene	86-73-7	50	8.4	ND	ND	µg/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Fluorene	86-73-7		0.81327	126.17		ng/L	Water	NA	1
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Fluorene	86-73-7	99	16.8	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Fluorene	86-73-7	498	84	ND	ND	ug/L	Water	NA	100
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Fluorene	86-73-7	2	0.27	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Fluorene	86-73-7	0.5	0.14	ND	ND	ug/L	Water	NA	5
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Fluorene	86-73-7		0.81	92.573		ng/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Fluorene	86-73-7	3.8	0.35	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Fluorene	86-73-7	4	0.69	ND	ND	ug/L	Water	NA	20
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Fluorene	86-73-7		0.81	105.22		ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Fluorene	86-73-7	4.7	0.87	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Fluorene	86-73-7	3.8	0.69	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Fluorene	86-73-7		0.81	78.007		ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Fluorene	86-73-7	20	0.87	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Fluorene	86-73-7	8	0.35	ND	ND	ug/L	Water	NA	10
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Fluorene	86-73-7		0.81	97.83		ng/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Fluoxetine	54910-89-3	NA	0.00144	0.052		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Fluoxetine	54910-89-3	0.149	NA	28.6		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Fluticasone propionate	80474-14-2	NA	0.00379		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Fluticasone propionate	80474-14-2	2	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Fonofos	944-22-9	NA	0.00016		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Furosemide	54-31-9	NA	0.0431	0.208		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Furosemide	54-31-9	11.9	NA	202	D	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Gamma-BHC (Lindane)	58-89-9	0.011	0.00046	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Gamma-BHC (Lindane)	58-89-9	0.011	0.00045	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Gamma-BHC (Lindane)	58-89-9	0.01	0.00044	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Gamma-BHC (Lindane)	58-89-9	0.011	0.0034	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Gamma-BHC (Lindane)	58-89-9	0.022	0.022	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Gamma-BHC (Lindane)	58-89-9	0.026	0.026	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Gamma-BHC (Lindane)	58-89-9	0.1	0.03	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Gamma-BHC (Lindane)	58-89-9	0.1	0.031	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	gamma-BHC (Lindane)	58-89-9	0.025	0.007	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	gamma-BHC (Lindane)	58-89-9	0.02	0.02	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	gamma-BHC (Lindane)	58-89-9	0.0055	0.0055	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	gamma-BHC (Lindane)	58-89-9	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	gamma-BHC (Lindane)	58-89-9	0.048	0.019	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	gamma-BHC (Lindane)	58-89-9	0.048		ND	ND	ug/L	Water	NA	10

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	gamma-BHC (Lindane)	58-89-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	gamma-BHC (Lindane)	58-89-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	gamma-BHC (Lindane)	58-89-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	gamma-BHC (Lindane)	58-89-9	0.005	0.005	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	gamma-Chlordane	5566-34-7	0.011	0.00034	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	gamma-Chlordane	5566-34-7	0.011	0.00076	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	gamma-Chlordane	5566-34-7	0.01	0.00032	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	gamma-Chlordane	5566-34-7	0.011	0.00033	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	gamma-Chlordane	5566-34-7	0.01	0.0026	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	gamma-Chlordane	5566-34-7	0.01	0.0026	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	gamma-Chlordane	5566-34-7	0.02	0.02	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	gamma-Chlordane	5566-34-7	0.0055	0.0055	ND	ND	ug/L	Water	NA	1
2023	SGS AXYS - Canada	NA	A23-RET-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-070 Rev	NA	HBCDD	gamma-HBCDD	134237-52-8	1.03	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Gemfibrozil	25812-30-0	NA	0.00638	1.33		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Gemfibrozil	25812-30-0	2.38	NA	183	D	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Glipizide	29094-61-9	NA	0.00576	0.0107		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Glipizide	29094-61-9	2.38	NA	4.58	D	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Glyburide	10238-21-8	NA	0.00288	0.0185		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Glyburide	10238-21-8	2.38	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	HCH, alpha	319-84-6	NA	4.8E-05	7E-05		ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	HCH, beta	319-85-7	NA	4.2E-05	0.0001		ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	HCH, delta	319-86-8	NA	3.7E-05		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	HCH, gamma	58-89-9	NA	5.1E-05	0.0007		ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Heptachlor	76-44-8	0.011	0.00038	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Heptachlor	76-44-8	0.011	0.00037	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Heptachlor	76-44-8	0.01	0.00036	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Heptachlor	76-44-8	0.011	0.0088	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Heptachlor	76-44-8	0.01	0.0023	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Heptachlor	76-44-8	0.01	0.0023	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Heptachlor	76-44-8	0.1	0.027	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Heptachlor	76-44-8	0.1	0.027	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Heptachlor	76-44-8	0.025	0.007	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Heptachlor	76-44-8	0.02	0.02	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Heptachlor	76-44-8	0.0068	0.0068	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Heptachlor	76-44-8	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Heptachlor	76-44-8	0.048	0.016	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Heptachlor	76-44-8	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Heptachlor	76-44-8	0.016	0.016	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Heptachlor	76-44-8	0.005	0.005	0.014		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Heptachlor	76-44-8	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Heptachlor	76-44-8	0.005	0.005	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Heptachlor	76-44-8	NA	2.2E-05		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Heptachlor Epoxide	1024-57-3	0.011	0.0041	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Heptachlor Epoxide	1024-57-3	0.011	0.0052	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Heptachlor Epoxide	1024-57-3	0.01	0.00032	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Heptachlor Epoxide	1024-57-3	0.011	0.0037	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Heptachlor Epoxide	1024-57-3	0.01	0.0014	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Heptachlor Epoxide	1024-57-3	0.01	0.0014	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Heptachlor Epoxide	1024-57-3	0.1	0.025	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Heptachlor Epoxide	1024-57-3	0.1	0.026	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Heptachlor Epoxide	1024-57-3	0.02	0.02	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Heptachlor Epoxide	1024-57-3	0.025	0.018	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Heptachlor Epoxide	1024-57-3	0.0055	0.0055	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Heptachlor Epoxide	1024-57-3	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Heptachlor Epoxide	1024-57-3	0.048	0.0029	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Heptachlor Epoxide	1024-57-3	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Heptachlor Epoxide	1024-57-3	0.005	0.005	ND	ND	ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Heptachlor Epoxide	1024-57-3	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Heptachlor Epoxide	1024-57-3	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Heptachlor Epoxide	1024-57-3	0.005	0.005	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Heptachlor Epoxide	1024-57-3	NA	6.7E-05		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Hexachlorobenzene	118-74-1	10	0.27	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Hexachlorobenzene	118-74-1	10	0.27	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Hexachlorobenzene	118-74-1	20	0.54	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Hexachlorobenzene	118-74-1	11	0.29	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Hexachlorobenzene	118-74-1	10	0.27	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Hexachlorobenzene	118-74-1	50	1.4	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Hexachlorobenzene	118-74-1	25.8	8.77	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Hexachlorobenzene	118-74-1	2	0.22	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Hexachlorobenzene	118-74-1	0.5	0.11	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Hexachlorobenzene	118-74-1	3.8	0.41	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Hexachlorobenzene	118-74-1	4	0.82	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Hexachlorobenzene	118-74-1	4.7	1.1	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Hexachlorobenzene	118-74-1	3.8	0.82	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Hexachlorobenzene	118-74-1	20	1.1	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Hexachlorobenzene	118-74-1	8	0.41	ND	ND	ug/L	Water	NA	10
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Hexachlorobenzene	118-74-1	NA	1.1E-05	0.0005		ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	10	0.22	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	10	0.22	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	20	0.44	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	11	0.24	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	10	0.22	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	50	1.1	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	25.8	6.19	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	2	0.27	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	0.5	0.14	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	3.8	2.1	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	4.2	4.2	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	5.3	5.3	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	4.2	4.2	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	20	5.3	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Hexachlorobutadiene	87-68-3	8	2.1	ND	ND	ug/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	10	0.58	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	10	0.58	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	20	1.2	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	11	0.62	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	10	0.58	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	50	2.9	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	25.8	2.58	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	2.5	0.95	ND	ND	UG/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	2.5	0.95	ND	ND	UG/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	19	11	ND	ND	UG/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/28/2021	625.1		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	22	22	ND	ND	UG/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	28	28	ND	ND	UG/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	22	22	ND	ND	UG/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	100	28	ND	ND	UG/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Hexachlorocyclopentadiene	77-47-4	40	11	ND	ND	UG/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Hexachloroethane	67-72-1	10	0.26	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Hexachloroethane	67-72-1	10	0.26	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Hexachloroethane	67-72-1	20	0.52	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Hexachloroethane	67-72-1	11	0.28	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Hexachloroethane	67-72-1	10	0.26	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Hexachloroethane	67-72-1	50	1.3	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Hexachloroethane	67-72-1	25.8	4.18	ND	ND	µg/L	Water	NA	5

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Hexachloroethane	67-72-1	2	0.24	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Hexachloroethane	67-72-1	0.5	0.12	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Hexachloroethane	67-72-1	3.8	2.1	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Hexachloroethane	67-72-1	4.1	4.1	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Hexachloroethane	67-72-1	5.2	5.2	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Hexachloroethane	67-72-1	4.1	4.1	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Hexachloroethane	67-72-1	20	5.2	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Hexachloroethane	67-72-1	8	2.1	ND	ND	ug/L	Water	NA	10
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Hexazinone	51235-04-2	NA	0.00179		U G	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	HFPO-DA	122499-17-6	5.43	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Hydrochlorothiazide	58-93-5	NA	0.0192	0.355		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Hydrochlorothiazide	58-93-5	11.9	NA	1070	D	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Hydrocodone	125-29-1	NA	0.00437	0.0687	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Hydrocodone	125-29-1	5.97	NA	25.9	D	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Hydrocortisone	50-23-7	NA	0.6	0.782		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Hydrocortisone	50-23-7	5.96	NA	207		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Ibuprofen	15687-27-1	NA	0.0982	20.9		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Ibuprofen	15687-27-1	11.9	NA	8150	D	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	10	0.45	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	10	0.45	ND	ND	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5		1.39219	44.437		ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	20	0.9	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	11	0.48	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5		1.39219	27.66		ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	10	0.45	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	50	2.3	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5		1.39219	ND	ND	ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	25.8	8.77	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	50	17	ND	ND	µg/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5		1.39219	ND	ND	ng/L	Water	NA	1
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	99	34	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	498	170	ND	ND	ug/L	Water	NA	100
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5		1.39	ND	ND	ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	2	0.21	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	0.5	0.11	ND	ND	ug/L	Water	NA	5
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5		1.39	5.658		ng/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	3.8	2	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	4	3.9	ND	ND	ug/L	Water	NA	20
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5		1.39	ND	ND	ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	4.9	4.9	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	3.9	3.9	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5		1.39	ND	ND	ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	20	4.9	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5	8	2	ND	ND	ug/L	Water	NA	10
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Indeno(1,2,3-c,d)pyrene	193-39-5		1.39	ND	ND	ng/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Isochlortetracycline [ICTC]	514-53-4	NA	0.00705		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Isophorone	78-59-1	10	0.35	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Isophorone	78-59-1	10	0.35	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Isophorone	78-59-1	20	0.7	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Isophorone	78-59-1	11	0.38	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Isophorone	78-59-1	10	0.35	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Isophorone	78-59-1	50	1.8	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Isophorone	78-59-1	25.8	9.28	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Isophorone	78-59-1	50	18	ND	ND	µg/L	Water	NA	10
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Isophorone	78-59-1	99	36	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Isophorone	78-59-1	498	180	ND	ND	ug/L	Water	NA	100
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Isophorone	78-59-1	0.5	0.08	ND	ND	ug/L	Water	NA	5

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Isophorone	78-59-1	2	0.16	0.38	J	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Isophorone	78-59-1	3.8	1.7	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Isophorone	78-59-1	4	3.3	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Isophorone	78-59-1	4.7	4.1	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Isophorone	78-59-1	3.8	3.3	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Isophorone	78-59-1	20	4.1	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Isophorone	78-59-1	8	1.7	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	KQ1908740-03	M19D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/19/2019	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.54		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-013	M19D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.63		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-023	M19D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.64		ug/L	Water	NA	1
2019	Brooks Applied Labs	B191820-DUP2	M19R-MTT-EF	RecWater	Effluent	Final Effluent	Lab Dup	06/18/2019	EPA 1640 RP	Total	Metals	Lead	7439-92-1	0.015	0.005	1.269		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-003	M19W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	2.1		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-008	M19W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	2.1		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-018	M19W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.87		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-003	M20D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	2.75		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-018	M20D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.69		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-028	M20D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.48		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-02RE2	M20R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Total	Metals	Lead	7439-92-1	0.03	0.01	1.51		ug/L	Water	NA	2
2020	ALS Environmental - WA	K2006972-003	M20W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.56		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-013	M20W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	2.01		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-023	M20W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.66		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-008	M21D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	4.8		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-016	M21D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.71		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-024	M21D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	2.44		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-18	M21R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Total	Metals	Lead	7439-92-1	0.015	0.005	2.51		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-008	M21W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.86		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-016	M21W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.8		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-024	M21W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	2.11		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-008	M22D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.62		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-016	M22D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.52		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-024	M22D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.84		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-32	M22R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Total	Metals	Lead	7439-92-1	0.12	0.06	1.27		ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209249-008	M22W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.9		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-016	M22W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.47		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-024	M22W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.48		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-04	M23D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/21/2023	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.29		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-06	M23D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	Lab Dup	6/22/2023	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.11		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-006	M23D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Total	Metals	Lead	7439-92-1	0.02	0.006	1.29		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-18	M23R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1640 Column	Total	Metals	Lead	7439-92-1	0.015	0.005	1.12		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-008	M23W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Total	Metals	Lead	7439-92-1	0.04	0.006	1.2		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-016	M23W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Total	Metals	Lead	7439-92-1	0.04	0.006	1.71		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-024	M23W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Total	Metals	Lead	7439-92-1	0.04	0.006	1.8		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-006DUP	MOA15TML002	SummerDry	Effluent	Final Effluent	Lab Dup	06/16/2015	200.8	Total	Metals	Lead	7439-92-1	0.02	0.007	1.634		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-018	MOA15TML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Total	Metals	Lead	7439-92-1	0.02	0.007	1.82		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-002	MOA15TML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Total	Metals	Lead	7439-92-1	0.02	0.007	3.23		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-007	MOA15TML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Total	Metals	Lead	7439-92-1	0.02	0.007	1.66		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-003	MOA15TML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Total	Metals	Lead	7439-92-1	0.02	0.002	1.56		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-013	MOA15TML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Total	Metals	Lead	7439-92-1	0.02	0.002	1.64		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-006	MOA16TML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Total	Metals	Lead	7439-92-1	0.02	0.002	1.76		µg/L	Water	NA	1
2016	ALS Environmental - WA	KQ1608088-05	MOA16TML004	SummerDry	Effluent	Final Effluent	Lab Dup	06/23/2016	200.8	Total	Metals	Lead	7439-92-1	0.02	0.002	1.58		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-012	MOA16TML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Total	Metals	Lead	7439-92-1	0.02	0.002	1.54		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-006	MOA16TML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Total	Metals	Lead	7439-92-1	0.02	0.004	1.91		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-002	MOA16TML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Total	Metals	Lead	7439-92-1	0.02	0.004	1.97		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-002	MOA16TML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Total	Metals	Lead	7439-92-1	0.02	0.004	2.01		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-22	MOA16TMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Total	Metals	Lead	7439-92-1	0.013	0.006	1.39		µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-17	MOA17DMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Total	Metals	Lead	7439-92-1	0.015	0.005	1.48		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-002	MOA17TML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Total	Metals	Lead	7439-92-1	0.02	0.004	1.87		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2017	ALS Environmental - WA	K1705999-002	MOA17TML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Total	Metals	Lead	7439-92-1	0.02	0.004	1.69		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-002	MOA17TML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Total	Metals	Lead	7439-92-1	0.02	0.004	4.61		µg/L	Water	NA	1
2017	ALS Environmental - WA	KQ1711770-05	MOA17TML008	SummerWet	Effluent	Final Effluent	Lab Dup	08/08/2017	200.8	Total	Metals	Lead	7439-92-1	0.02	0.004	1.4		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-041	MOA17TML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Total	Metals	Lead	7439-92-1	0.02	0.004	1.33		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-051	MOA17TML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Total	Metals	Lead	7439-92-1	0.02	0.004	1.37		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-004	MOA18TML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Total	Metals	Lead	7439-92-1	0.02	0.004	2.21		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-014	MOA18TML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Total	Metals	Lead	7439-92-1	0.02	0.004	1.66		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-024	MOA18TML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Total	Metals	Lead	7439-92-1	0.02	0.004	0.782		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-004	MOA18TML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Total	Metals	Lead	7439-92-1	0.02	0.007	1.81		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-014	MOA18TML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Total	Metals	Lead	7439-92-1	0.02	0.007	1.67		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-024	MOA18TML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Total	Metals	Lead	7439-92-1	0.02	0.007	1.92		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-16RE1	MOA18TMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Total	Metals	Lead	7439-92-1	0.015	0.005	1.56		µg/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Lincomycin	154-21-2	NA	0.003	0.0435		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Lincomycin	154-21-2	0.596	NA	4.36		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Lomefloxacin	98079-51-7	NA	0.003		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Lomefloxacin	98079-51-7	0.596	NA	ND	U	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	m,p-Xylenes	179601-23-1	1	0.14	1.2		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506653-001	MOA15VOA008	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	624		VOCs	m,p-Xylenes	179601-23-1	0.5	0.14	ND	UB	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	m,p-Xylenes	179601-23-1	1	0.14	5.2		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607039-001	MOA16VOA008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	624		VOCs	m,p-Xylenes	179601-23-1	0.5	0.14	1.9		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	m,p-Xylenes	179601-23-1	1	0.14	2		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	m,p-Xylenes	179601-23-1	1	0.14	0.72	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	m,p-Xylenes	179601-23-1	1	0.14	2.5		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1706002-001	MOA17VOA008	RecWater	Effluent	Final Effluent	SAMP	06/06/2017	624		VOCs	m,p-Xylenes	179601-23-1	0.5	0.14	2.2		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	m,p-Xylenes	179601-23-1	1	0.14	1.6		µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	m,p-Xylenes	179601-23-1	10	1.55	3.55	J	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	m,p-Xylenes	179601-23-1	2	0.31	ND	UB	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806164-001	MOA18VOA008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 624		VOCs	m,p-Xylenes	179601-23-1	0.5	0.14	6.2		µg/L	Water	NA	1
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	m,p-Xylenes	179601-23-1	10	1.55	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	m,p-Xylenes	179601-23-1	10	1.55	1.65	J	ug/L	Water	NA	5
2019	ALS Environmental - WA	K1905864-001	M19R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	EPA 624		VOCs	m,p-Xylenes	179601-23-1	0.5	0.14	1.6		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	m,p-Xylenes	179601-23-1	1	0.01	0.78	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	m,p-Xylenes	179601-23-1	1	0.01	0.21	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005387-010	M20R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	624.1		VOCs	m,p-Xylenes	179601-23-1	0.5	0.01	0.62		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106804-001	M21R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	m,p-Xylenes	179601-23-1	1	0.1	0.58	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	m,p-Xylenes	179601-23-1	1	0.1	0.69	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	m,p-Xylenes	179601-23-1	5	0.1	0.62	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	m,p-Xylenes	179601-23-1	1	0.1	0.52	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	m,p-Xylenes	179601-23-1	1	0.1	2.3		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	m,p-Xylenes	179601-23-1	5	0.1	3.1	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	m,p-Xylenes	179601-23-1	1	0.1	1.4		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8141B		Pesticides	Malathion	121-75-5	0.21	0.016	0.52		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8141B		Pesticides	Malathion	121-75-5	0.22	0.016	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8141B		Pesticides	Malathion	121-75-5	0.4	0.24	ND	ND	µg/L	Water	NA	2
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8141B		Pesticides	Malathion	121-75-5	0.22	0.017	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8141B		Pesticides	Malathion	121-75-5	0.21	0.052	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8141B		Pesticides	Malathion	121-75-5	0.21	0.062	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-4	MOA18POP002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8141A		Pesticides	Malathion	121-75-5	5.3	2.8	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-4	MOA18POP005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8141A		Pesticides	Malathion	121-75-5	5.0	2.7	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-003	M19D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	ALS SOP		Pesticides	Malathion	121-75-5	0.05		ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908294-003	M19W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	ALS SOP		Pesticides	Malathion	121-75-5	0.05	0.005	0.011	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-009	M20D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	ALS SOP		Pesticides	Malathion	121-75-5	0.053	0.0053	0.013	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-009	M20W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	ALS SOP		Pesticides	Malathion	121-75-5	0.05	0.005	0.012	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-006	M21W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	ALS SOP		Pesticides	Malathion	121-75-5	0.049	0.005	ND	ND,H	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-006	M21D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	ALS SOP		Pesticides	Malathion	121-75-5	0.24	0.025	ND	ND	ug/L	Water	NA	5
2022	ALS Environmental - WA	K2206847-004	M22D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	ALS SOP		Pesticides	Malathion	121-75-5	0.05	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-004	M22W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	ALS SOP		Pesticides	Malathion	121-75-5	0.048	0.005	ND	ND	ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	ALS Environmental - WA	K2307112-004	M23D-POP-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	ALS SOP		Pesticides	Malathion	121-75-5	0.05	0.005	0.01	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-004	M23W-POP-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	ALS SOP		Pesticides	Malathion	121-75-5	0.049	0.005	0.02	J	ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Malathion	121-75-5	NA	0.00678		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	MeFOSAA	2355-31-9	1.36	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Meprobamate	57-53-4	NA	0.00549	0.383		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Meprobamate	57-53-4	1.49	NA	16.8		ng/L	Aqueous	NA	NA
2019	ALS Environmental - WA	K1905862-010	M19D-THG-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0236		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-015	M19D-THG-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.024		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-025	M19D-THG-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0234		ug/L	Water	NA	1
2019	Brooks Applied Labs	1925069-20	M19R-HGT-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0004	0.00013	0.0196		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-005	M19W-THG-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0347		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-010	M19W-THG-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0337		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-020	M19W-THG-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0318		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-005	M20D-THG-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0245		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-020	M20D-THG-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0244		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-030	M20D-THG-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0228		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-04	M20R-HGT-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0004	0.00013	0.0161		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-005	M20W-THG-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0219		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-015	M20W-THG-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0268		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-025	M20W-THG-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0258		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-006	M21D-THG-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0651		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-014	M21D-THG-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0285		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-022	M21D-THG-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0259		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-20	M21R-HGT-EF	RecWater	Effluent	Final Effluent	SAMP	06/09/2021	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0004	0.00014	0.114		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-006	M21W-THG-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0177		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-014	M21W-THG-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0196		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-022	M21W-THG-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0239		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-006	M22D-THG-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0191		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-014	M22D-THG-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.023		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-022	M22D-THG-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0187		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-34	M22R-HGT-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0004	0.00013	0.0138		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-006	M22W-THG-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0215		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-014	M22W-THG-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0207		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-022	M22W-THG-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.02		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307205-002	M23D-THG-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.02		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307205-004	M23D-THG-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0169		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307205-006	M23D-THG-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0153		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-20	M23R-HGT-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0004	0.00013	0.0176		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-006	M23W-THG-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0223		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-014	M23W-THG-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0269		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-022	M23W-THG-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0344		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-010	MOA15MCT002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0283		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-022	MOA15MCT004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0287		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-006	MOA15MCT006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0399		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-019	MOA15MCT008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0257		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-009	MOA15MCT010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.027		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-019	MOA15MCT012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0287		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-010	MOA16MCT002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	1631E	Total	Metals	Mercury	7439-97-6	0.0025	0.0003	0.035		µg/L	Water	NA	5
2016	ALS Environmental - WA	K1607065-006	MOA16MCT004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	1631E	Total	Metals	Mercury	7439-97-6	0.0025	0.0003	0.0298		µg/L	Water	NA	5
2016	ALS Environmental - WA	K1607065-016	MOA16MCT006	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	1631E	Total	Metals	Mercury	7439-97-6	0.0025	0.0003	0.0325		µg/L	Water	NA	5
2016	ALS Environmental - WA	K1609222-010	MOA16MCT008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.046		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-006	MOA16MCT010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.03		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-006	MOA16MCT012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.0352		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-24	MOA16THG008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0004	0.00011	0.02420		µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-19	MOA17DHG008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0012	0.0004	0.0065		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-006	MOA17MCT002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.03970		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-006	MOA17MCT004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.03230		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2017	ALS Environmental - WA	K1705997-006	MOA17MCT006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.03280		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-012	MOA17MCT008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.02240		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-045	MOA17MCT010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	1631E	Total	Metals	Mercury	7439-97-6	0.0025	0.0003	0.02590		µg/L	Water	NA	5
2017	ALS Environmental - WA	K1708356-055	MOA17MCT012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	1631E	Total	Metals	Mercury	7439-97-6	0.0025	0.0003	0.02270		µg/L	Water	NA	5
2017	Brooks Applied Labs	1723032-20	MOA17THG008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0013	0.00042	0.0522		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-008	MOA18MCT002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	1631E	Total	Metals	Mercury	7439-97-6	0.0025	0.0003	0.03100		µg/L	Water	NA	5
2018	ALS Environmental - WA	K1806181-018	MOA18MCT004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.02630		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-028	MOA18MCT006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	1631E	Total	Metals	Mercury	7439-97-6	0.0025	0.0003	0.02920		µg/L	Water	NA	5
2018	ALS Environmental - WA	K1808088-008	MOA18MCT008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.02550		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-018	MOA18MCT010	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.05260		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-028	MOA18MCT012	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	1631E	Total	Metals	Mercury	7439-97-6	0.0005	0.00006	0.02600		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-18	MOA18THG008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1631 E	Total	Metals	Mercury	7439-97-6	0.0004	0.00014	0.0232		µg/L	Water	NA	1
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Mestranol	72-33-3	174	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Metformin	657-24-9	NA	0.18	89.3	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Metformin	657-24-9	3.48	NA	45900	D	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Methamidophos	10265-92-6	NA	0.00895		U G	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Methoxychlor	72-43-5	0.016	0.016	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Methoxychlor	72-43-5	0.011	0.011	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Methoxychlor	72-43-5	0.01	0.00093	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Methoxychlor	72-43-5	0.011	0.00095	0.0029	J,P	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Methoxychlor	72-43-5	0.01	0.0044	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Methoxychlor	72-43-5	0.01	0.0044	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Methoxychlor	72-43-5	0.1	0.026	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Methoxychlor	72-43-5	0.025	0.012	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Methoxychlor	72-43-5	0.02	0.02	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Methoxychlor	72-43-5	0.0082	0.0082	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Methoxychlor	72-43-5	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Methoxychlor	72-43-5	0.048	0.024	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Methoxychlor	72-43-5	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Methoxychlor	72-43-5	0.012	0.012	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Methoxychlor	72-43-5	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Methoxychlor	72-43-5	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Methoxychlor	72-43-5	0.005	0.005	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Methoxychlor	72-43-5	NA	0.002		U G	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8141B		Pesticides	Methyl Parathion	298-00-0	0.51	0.054	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8141B		Pesticides	Methyl Parathion	298-00-0	1.4	1.4	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8141B		Pesticides	Methyl Parathion	298-00-0	1	0.045	ND	ND	µg/L	Water	NA	2
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8141B		Pesticides	Methyl Parathion	298-00-0	0.55	0.044	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8141B		Pesticides	Methyl Parathion	298-00-0	0.53	0.47	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8141B		Pesticides	Methyl Parathion	298-00-0	0.55	0.55	ND	ND	µg/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Methylprednisolone	83-43-2	NA	0.0752	0.113	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Methylprednisolone	83-43-2	3.97	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Metoprolol	51384-51-1	NA	0.0141	0.46		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Metoprolol	51384-51-1	0.499	NA	489		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Metribuzin	21087-64-9	NA	0.00462		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Miconazole	22916-47-8	NA	0.00568	0.0562		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Miconazole	22916-47-8	0.298	NA	1.97		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Minocycline	10118-90-8	NA	0.099		U	ug/L	Water	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Mirex	2385-85-5	0.011	0.00085	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Mirex	2385-85-5	0.011	0.0017	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Mirex	2385-85-5	0.01	0.00081	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Mirex	2385-85-5	0.011	0.0024	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Mirex	2385-85-5	0.01	0.0077	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Mirex	2385-85-5	0.01	0.0077	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Mirex	2385-85-5	0.1	0.029	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Mirex	2385-85-5	0.1	0.03	ND	ND	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Mirex	2385-85-5	0.02	0.02	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Mirex	2385-85-5	0.025	0.0078	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Mirex	2385-85-5	0.007	0.007	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Mirex	2385-85-5	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Mirex	2385-85-5	0.048	0.029	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Mirex	2385-85-5	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Mirex	2385-85-5	0.0057	0.0057	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Mirex	2385-85-5	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Mirex	2385-85-5	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Mirex	2385-85-5	0.005	0.005	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Mirex	2385-85-5	NA	2.6E-05		U G	ug/L	Water	NA	NA
2019	ALS Environmental - WA	K1905862-008	M19D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	3.57		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-013	M19D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	4.39		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-023	M19D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	2.25		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-003	M19W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	1.98		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-008	M19W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	48.7		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-018	M19W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	7.97		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-003	M20D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	6.95		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-018	M20D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	3.37		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-028	M20D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	5.78		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-003	M20W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	1.69		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-013	M20W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	2.6		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-023	M20W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	2.17		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-008	M21D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	1.72		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-016	M21D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	2.17		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-024	M21D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	2.18		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-008	M21W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	1.58		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-016	M21W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	4.35		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-024	M21W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	3.92		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-008	M22D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	1.91		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-016	M22D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	1.85		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-024	M22D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	2.18		ug/L	Water	NA	1
2022	ALS Environmental - WA	KQ2213818-05	M22W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	Lab Dup	8/8/2022	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	1.99		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-016	M22W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	1.68		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-024	M22W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	2.02		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-04	M23D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/21/2023	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	5.49		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-06	M23D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	Lab Dup	6/22/2023	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	3.6		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-006	M23D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	1.84		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-008	M23W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	1.51		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-016	M23W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	2.01		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-024	M23W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	2.48		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-006	MOA15TML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.01	4.57		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-018	MOA15TML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.01	3.85		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-002DUP	MOA15TML006	SummerDry	Effluent	Final Effluent	Lab Dup	06/18/2015	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.01	2.9		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-007	MOA15TML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.01	2.62		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-003	MOA15TML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.008	5.77		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-013	MOA15TML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.008	5.91		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-006	MOA16TML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.008	3.09		µg/L	Water	NA	1
2016	ALS Environmental - WA	KQ1608088-05	MOA16TML004	SummerDry	Effluent	Final Effluent	Lab Dup	06/23/2016	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.008	6.86		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-012	MOA16TML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.008	4.36		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-006	MOA16TML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.02	2.59		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-002	MOA16TML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.02	3.25		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-002	MOA16TML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.02	4.36		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-002	MOA17TML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.02	5.3		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-002	MOA17TML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.02	3.28		µg/L	Water	NA	1
2017	ALS Environmental - WA	KQ1707755-03	MOA17TML006	SummerDry	Effluent	Final Effluent	Lab Dup	06/09/2017	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.02	2.93		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-008	MOA17TML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.02	5.52		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2017	ALS Environmental - WA	K1708356-041	MOA17TML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.02	2.07		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-051	MOA17TML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Total	Metals	Molybdenum	7439-98-7	0.05	0.02	4.33		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-004	MOA18TML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	3.99		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-014	MOA18TML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	2.8		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-024	MOA18TML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.03	2.14		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-004	MOA18TML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.006	2.47		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-014	MOA18TML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.006	6.56		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-024	MOA18TML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Total	Metals	Molybdenum	7439-98-7	0.1	0.006	3.49		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Naphthalene	91-20-3	10	0.31	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Naphthalene	91-20-3	10	0.31	ND	ND	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Naphthalene	91-20-3		2.90766	160.4		ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Naphthalene	91-20-3	20	0.62	0.98	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Naphthalene	91-20-3	11	0.33	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Naphthalene	91-20-3		2.90766	144.06		ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Naphthalene	91-20-3	10	0.31	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Naphthalene	91-20-3	50	1.6	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Naphthalene	91-20-3		2.90766	111.21		ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Naphthalene	91-20-3	25.8	2.74	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Naphthalene	91-20-3	50	5.3	ND	ND	µg/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Naphthalene	91-20-3		2.90766	153.57		ng/L	Water	NA	1
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Naphthalene	91-20-3	99	10.6	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Naphthalene	91-20-3	498	53	ND	ND	ug/L	Water	NA	100
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Naphthalene	91-20-3		2.91	126.93		ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Naphthalene	91-20-3	2	0.22	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Naphthalene	91-20-3	0.5	0.11	ND	ND	ug/L	Water	NA	5
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Naphthalene	91-20-3		2.91	114.97		ng/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Naphthalene	91-20-3	3.8	0.39	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Naphthalene	91-20-3	4	0.77	ND	ND	ug/L	Water	NA	20
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Naphthalene	91-20-3		2.91	330.5		ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Naphthalene	91-20-3	4.7	0.96	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Naphthalene	91-20-3	3.8	0.77	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Naphthalene	91-20-3		2.91	101.76		ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Naphthalene	91-20-3	20	0.96	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Naphthalene	91-20-3	8	0.39	ND	ND	ug/L	Water	NA	10
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Naphthalene	91-20-3		2.91	121.04		ng/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Naphthobenzothiophene	205-43-6		1.03336	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Naphthobenzothiophene	205-43-6		1.03336	13.505		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Naphthobenzothiophene	205-43-6		1.03336	19.754		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Naphthobenzothiophene	205-43-6		1.03336	33.746		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Naphthobenzothiophene	205-43-6		1.03	12.691		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Naphthobenzothiophene	205-43-6		1.03	ND	ND	ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Naphthobenzothiophene	205-43-6		1.03	22.225		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Naphthobenzothiophene	205-43-6		1.03	13.962		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Naphthobenzothiophene	205-43-6		1.03	18.264		ng/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Naproxen	22204-53-1	NA	0.00704	12.4		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Naproxen	22204-53-1	5.96	NA	6250	D	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	N-EtFOSA	4151-50-2	3.8	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	N-EtFOSE	1691-99-2	13.6	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	NFDHA	39187-41-2	2.72	NA	ND	U	ng/L	Aqueous	NA	NA
2019	ALS Environmental - WA	KQ1908740-03	M19D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/19/2019	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	6.26		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-013	M19D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.76		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-023	M19D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	3.76		ug/L	Water	NA	1
2019	Brooks Applied Labs	1925069-18	M19R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1640 RP	Total	Metals	Nickel	7440-02-0	0.14	0.04	1.21	J-	ug/L	Water	NA	1
2019	ALS Environmental - WA	KQ1915567-01	M19W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	Lab Dup	9/10/2019	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	5.92		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-008	M19W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	6.7		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-018	M19W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	5.95		ug/L	Water	NA	1
2020	ALS Environmental - WA	KQ2008836-03	M20D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/24/2020	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.97		ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2020	ALS Environmental - WA	K2005385-018	M20D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	5.15		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-028	M20D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.92		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-02RE2	M20R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Total	Metals	Nickel	7440-02-0	0.28	0.08	1.07		ug/L	Water	NA	2
2020	ALS Environmental - WA	K2006972-003	M20W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	5.02		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-013	M20W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	5.86		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-023	M20W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	6.19		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-008	M21D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	5.37		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-016	M21D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	3.65		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-024	M21D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	3.84		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-18	M21R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Total	Metals	Nickel	7440-02-0	0.14	0.04	1.3	J-	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-008	M21W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	3.23		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-016	M21W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.19		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-024	M21W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	5.03		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-008	M22D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.5		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-016	M22D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.3		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-024	M22D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.63		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-32	M22R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Total	Metals	Nickel	7440-02-0	3.6	1.2	2.83	J	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209249-008	M22W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.76		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-016	M22W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.55		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-024	M22W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.75		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-002	M23D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	3.93		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-06	M23D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	Lab Dup	6/22/2023	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.76		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-006	M23D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	5.18		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-18	M23R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1640 Column	Total	Metals	Nickel	7440-02-0	0.144	0.048	2.56		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-008	M23W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.41		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-016	M23W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.2		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-024	M23W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.59		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-006	MOA15TML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.76		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-018	MOA15TML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.37		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-002	MOA15TML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.21		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-007	MOA15TML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	2.85		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-003	MOA15TML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.08		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-013	MOA15TML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.56		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-006	MOA16TML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.53		µg/L	Water	NA	1
2016	ALS Environmental - WA	KQ1608088-05	MOA16TML004	SummerDry	Effluent	Final Effluent	Lab Dup	06/23/2016	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.83		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-012	MOA16TML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	5.19		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-006	MOA16TML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.02	5.04		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-002	MOA16TML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.02	5.22		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-002	MOA16TML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.02	5.57		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-22	MOA16TMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Total	Metals	Nickel	7440-02-0	0.14	0.04	1.41		µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-17	MOA17DMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Total	Metals	Nickel	7440-02-0	0.14	0.04	2.14		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-002	MOA17TML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.02	4.96		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-002	MOA17TML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.02	3.85		µg/L	Water	NA	1
2017	ALS Environmental - WA	KQ1707755-03	MOA17TML006	SummerDry	Effluent	Final Effluent	Lab Dup	06/09/2017	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.02	4.26		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-008	MOA17TML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.02	4.63		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-041	MOA17TML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.02	4.79		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-051	MOA17TML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.02	5		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-004	MOA18TML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.72		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-014	MOA18TML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.72		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-024	MOA18TML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.2		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-004	MOA18TML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.39		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-014	MOA18TML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.48		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-024	MOA18TML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Total	Metals	Nickel	7440-02-0	0.2	0.04	4.38		µg/L	Water	NA	1
2018	Brooks Applied Labs	B181985-DUP1	MOA18TMT008	RecWater	Effluent	Final Effluent	Lab Dup		EPA 1640 RP	Total	Metals	Nickel	7440-02-0	0.14	0.04	1.29		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Nitrobenzene	98-95-3	10	0.36	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Nitrobenzene	98-95-3	10	0.36	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Nitrobenzene	98-95-3	20	0.72	ND	ND	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Nitrobenzene	98-95-3	11	0.39	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Nitrobenzene	98-95-3	10	0.36	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Nitrobenzene	98-95-3	50	1.8	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Nitrobenzene	98-95-3	25.8	10.9	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Nitrobenzene	98-95-3	2	0.28	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Nitrobenzene	98-95-3	0.5	0.14	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Nitrobenzene	98-95-3	3.8	1.4	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Nitrobenzene	98-95-3	4	2.8	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Nitrobenzene	98-95-3	4.7	3.5	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Nitrobenzene	98-95-3	3.8	2.8	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Nitrobenzene	98-95-3	20	3.5	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Nitrobenzene	98-95-3	8	1.4	ND	ND	ug/L	Water	NA	10
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	N-MeFOSA	31506-32-8	1.36	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	N-MeFOSE	24448-09-7	13.6	NA	ND	U	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	25	1.7	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	25	1.7	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	50	3.4	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	27	1.9	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	25	1.7	9.6	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	130	8.5	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	25.8	4.95	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	5	2.1	ND	ND	UG/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	5	2.1	ND	ND	UG/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	3.8	2.8	ND	ND	UG/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/28/2021	625.1		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	5.5	5.5	ND	ND	UG/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	6.9	6.9	ND	ND	UG/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	5.5	5.5	ND	ND	UG/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	20	6.9	ND	ND	UG/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	N-Nitrosodimethylamine	62-75-9	8	2.8	ND	ND	UG/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	10	0.51	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	10	0.51	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	20	1.1	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	11	0.55	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	10	0.51	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	50	2.6	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	25.8	11.4	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	2	0.37	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	0.5	0.19	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	3.8	1.4	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	4	2.8	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	4.7	3.5	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	3.8	2.8	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	20	3.5	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	N-Nitrosodi-n-propylamine	621-64-7	8	1.4	ND	ND	ug/L	Water	NA	10
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	10	0.34	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	10	0.34	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	20	0.68	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	11	0.37	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	10	0.34	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	50	1.7	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	1	0.24	ND	ND	UG/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	0.5	0.24	ND	ND	UG/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	3.8	0.82	ND	ND	UG/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/28/2021	625.1		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	4	1.7	ND	ND	UG/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	4.7	2.1	ND	ND	UG/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	3.8	1.7	ND	ND	UG/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	20	2.1	ND	ND	UG/L	Water	NA	25

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	N-Nitrosodiphenylamine	86-30-6	8	0.82	ND	ND	UG/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	N-Nitrosodiphenylamine / Diphenyla	NA	25.8	5.68	ND	ND	µg/L	Water	NA	5
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Nonachlor, cis-	5103-73-1	NA	5.4E-05		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Nonachlor, trans-	39765-80-5	NA	0.0001		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Norethindrone	68-22-4	8.17	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Norfloxacin	70458-96-7	NA	0.141		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Norfloxacin	70458-96-7	5.19	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Norfluoxetine	83891-03-6	NA	0.00627	0.0273	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Norfluoxetine	83891-03-6	0.499	NA	7.89		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Norgestimate	35189-28-7	NA	0.0187		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Norgestimate	35189-28-7	1.49	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Norgestrel	6533-00-2	12.7	NA	81.8		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Norverapamil	67018-85-3	NA	0.00043	0.0189	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Norverapamil	67018-85-3	0.149	NA	5.95		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFNP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Alkylphenols	Octylphenol	1806-26-4	NA	0.00788		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Ofloxacin	82419-36-1	NA	0.00144	0.427		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Ofloxacin	82419-36-1	0.596	NA	87.9		ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506642-004	MOA15OIL002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	5.3	0.8	18.9		mg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-004	MOA15OIL004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	5.4	0.8	12.5		mg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-004	MOA16OIL002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	4.8	0.7	13.4		mg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-004	MOA16OIL004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	5.8	0.9	16.5		mg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-006	MOA17OIL002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	5	0.7	36.5		mg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-006	MOA17OIL004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	4.8	0.7	28.2		mg/L	Water	NA	1
2018	ALS Environmental - WA	K1806164-012	MOA18OIL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	4	0.7	29.1		mg/L	Water	NA	1
2018	ALS Environmental - WA	K1807985-006	MOA18OIL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	5	0.7	35.8		mg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-005	M19D-OIL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/18/2019	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	4.6	0.7	24.2		mg/L	Water	NA	1
2019	ALS Environmental - WA	K1908294-005	M19W-OIL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/9/2019	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	4.8	0.7	29		mg/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-011	M20D-OIL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	4.9	0.7	30		mg/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-011	M20W-OIL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	5	0.7	25.7		mg/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-010	M21D-OIL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	4.7	0.7	42.7		mg/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-010	M21W-OIL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	5.8	0.9	40.7		mg/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-008	M22D-OIL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	4.9	0.7	42.4		mg/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-008	M22W-OIL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	5.1	0.8	29		mg/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-008	M23D-OIL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	4.8	1.4	27.9		mg/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-008	M23W-OIL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	1664A		Oil & Grease	Oil and Grease, Total (HEM)	NA	4.7	1.4	26.4		mg/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Ormetoprim	6981-18-6	NA	0.0006		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Ormetoprim	6981-18-6	0.149	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Oxacillin	66-79-5	NA	0.00628		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Oxacillin	66-79-5	1.49	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Oxolinic Acid	14698-29-4	NA	0.00248		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Oxolinic Acid	14698-29-4	0.596	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Oxycodone	76-42-6	NA	0.047	0.16	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Oxycodone	76-42-6	2.98	NA	55.9	D	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	o-Xylene	95-47-6	0.5	0.024	0.6		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506653-001	MOA15VOA008	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	624		VOCs	o-Xylene	95-47-6	0.5	0.024	0.53		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	o-Xylene	95-47-6	0.5	0.024	2.3		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607039-001	MOA16VOA008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	624		VOCs	o-Xylene	95-47-6	0.5	0.021	0.92		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	o-Xylene	95-47-6	0.5	0.021	1.1		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	o-Xylene	95-47-6	0.5	0.021	0.4	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	o-Xylene	95-47-6	0.5	0.021	0.99		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1706002-001	MOA17VOA008	RecWater	Effluent	Final Effluent	SAMP	06/06/2017	624		VOCs	o-Xylene	95-47-6	0.5	0.021	0.74		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	o-Xylene	95-47-6	0.5	0.021	0.84		µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	o-Xylene	95-47-6	5	0.7	1.65	J	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	o-Xylene	95-47-6	1	0.14	0.31	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806164-001	MOA18VOA008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 624		VOCs	o-Xylene	95-47-6	0.5	0.021	2.6		µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	o-Xylene	95-47-6	5	0.7	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	o-Xylene	95-47-6	5	0.7	ND	ND	ug/L	Water	NA	5

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2019	ALS Environmental - WA	K1905864-001	M19R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	EPA 624		VOCs	o-Xylene	95-47-6	0.5	0.021	0.68		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005387-010	M20R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	624.1		VOCs	o-Xylene	95-47-6	0.5	0.01	0.27	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	o-Xylene	95-47-6	0.5	0.01	0.35	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	o-Xylene	95-47-6	0.5	0.01	0.1	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106804-001	M21R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	o-Xylene	95-47-6	0.5	0.05	0.33	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	o-Xylene	95-47-6	0.5	0.05	0.34	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	o-Xylene	95-47-6	5	0.05	0.29	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	o-Xylene	95-47-6	0.5	0.05	0.33	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	o-Xylene	95-47-6	0.5	0.05	0.99		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	o-Xylene	95-47-6	5	0.05	1.5	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	o-Xylene	95-47-6	0.5	0.05	0.54		ug/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Oxytetracyclin [OTC]	79-57-2	NA	0.0124		U	ug/L	Water	NA	NA
2018	Eurofins Calscience, Inc.	18-06-2077-4	MOA18POP002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8141A		Pesticides	Parathion	56-38-2	5.3	3.2	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-4	MOA18POP005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8141A		Pesticides	Parathion	56-38-2	5.0	3.0	ND	ND	µg/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Parathion-Ethyl	56-38-2	NA	0.00245		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Parathion-Methyl	298-00-0	NA	0.0123		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Paroxetine	61869-08-7	NA	0.012	0.0188	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Paroxetine	61869-08-7	0.999	NA	3.52		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Penicillin G	61-33-6	NA	0.00288		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Penicillin G	61-33-6	2.98	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Penicillin V	87-08-1	NA	0.00553	0.0134		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Penicillin V	87-08-1	1.49	NA	ND	U	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	25	0.38	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	25	0.38	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	50	0.76	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	27	0.41	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	25	0.38	6.3	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	130	1.9	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	103	5.68	ND	ND	µg/L	Water	NA	5
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	10	3.4	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	2.5	1.7	ND	ND	ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	9.4	4.9	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	10	9.8	ND	ND	ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	24	13	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	9.8	9.8	ND	ND	ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	50	13	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Pentachlorophenol (PCP)	87-86-5	20	4.9	ND	ND	ug/L	Water	NA	10
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Permethrin	52645-53-1	NA	0.00246	0.0423		ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Perthane	72-56-0	NA	0.0227		U	ug/L	Water	NA	NA
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Perylene	198-55-0		0.63472	6.042		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Perylene	198-55-0		0.63472	3.1352		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Perylene	198-55-0		0.63472	ND	ND	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Perylene	198-55-0		0.63472	7.181		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Perylene	198-55-0		0.63	18.275		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Perylene	198-55-0		0.63	33.318		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Perylene	198-55-0		0.63	22.396		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Perylene	198-55-0		0.63	11.019		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Perylene	198-55-0		0.63	24.692		ng/L	Water	NA	1
2010	AXYS	NA	EFFPFC-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	PFCs	PFBA	375-22-4	NA	0.00104	0.005		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFBA	45048-62-2	5.43	NA	14.9	J	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPFC-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	PFCs	PFBS	375-73-5	NA	0.00208		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPFC-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	PFCs	PFDA	335-76-2	NA	0.00104		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFDA	73829-36-4	1.36	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPFC-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	PFCs	PFDoA	335-76-2	NA	0.00104		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFDoA	171978-95-3	1.09	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFDoS	343629-43-6	1.36	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFDS	126105-34-8	1.36	NA	ND	U	ng/L	Aqueous	NA	NA

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFEESA	220689-13-4	1.36	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPFC-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	PFCs	PFHpA	375-85-9	NA	0.00104	0.0085		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFHpA	120885-29-2	1.36	NA	7.21		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPFC-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	PFCs	PFHxA	307-24-4	NA	0.00104	0.0228		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFHxA	92612-52-7	1.36	NA	25.5		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPFC-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	PFCs	PFHxS	355-46-4	NA	0.00201	0.0396		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFHxS	108427-53-8	1.36	NA	25.5		ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFMBA	432017-36-[illegible]	1.36	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFMPA		2.72	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPFC-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	PFCs	PFNA	375-95-1	NA	0.00101	0.0051		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFNA	72007-68-2	1.36	NA	2.68	J	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFNS	474511-07-4	1.36	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPFC-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	PFCs	PFOA	335-67-1	NA	0.00104	0.0173		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFOA	45285-51-6	1.36	NA	18.5		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPFC-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	PFCs	PFOS	1763-23-1	NA	0.00201	0.024		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFOS	45298-90-6	1.36	NA	65.3		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPFC-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	PFCs	PFOSA	1763-23-1	NA	0.00104		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFOSA	754-91-6	1.36	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPFC-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	PFCs	PFPeA	2706-90-3	NA	0.00104	0.0088		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFPeA	45167-47-3	2.72	NA	20.3		ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFPeS	175905-36-9	1.37	NA	3.84	J	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFTeDA	365971-87-5	1.36	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFTrDA	862374-87-6	1.36	NA	ND	U	ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PFS-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-110 Rev	NA	PFAS	PFUnA	196859-54-8	1.36	NA	ND	U	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Phenanthrene	85-01-8	10	0.24	0.34	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Phenanthrene	85-01-8	10	0.24	0.32	J	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Phenanthrene	85-01-8		2.26307	349.15		ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Phenanthrene	85-01-8	20	0.48	0.98	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Phenanthrene	85-01-8	11	0.26	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Phenanthrene	85-01-8		2.26307	252.38		ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Phenanthrene	85-01-8	10	0.24	0.42	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Phenanthrene	85-01-8	50	1.2	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Phenanthrene	85-01-8		2.26307	353.38		ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Phenanthrene	85-01-8	25.8	7.22	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Phenanthrene	85-01-8	50	14	ND	ND	µg/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Phenanthrene	85-01-8		2.26307	521.37		ng/L	Water	NA	1
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Phenanthrene	85-01-8	99	28	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Phenanthrene	85-01-8	498	140	ND	ND	ug/L	Water	NA	100
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Phenanthrene	85-01-8		2.26	235.27		ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Phenanthrene	85-01-8	2	0.22	0.44	J	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Phenanthrene	85-01-8	0.5	0.11	0.22	J	ug/L	Water	NA	5
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Phenanthrene	85-01-8		2.26	320.38		ng/L	Water	NA	1
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Phenanthrene	85-01-8	4	0.67	ND	ND	ug/L	Water	NA	20
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Phenanthrene	85-01-8	3.8	0.34	0.45	J	ug/L	Water	NA	10
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Phenanthrene	85-01-8		2.26	334.18		ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Phenanthrene	85-01-8	4.7	0.84	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Phenanthrene	85-01-8	3.8	0.67	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Phenanthrene	85-01-8		2.26	203.93		ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Phenanthrene	85-01-8	20	0.84	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Phenanthrene	85-01-8	8	0.34	ND	ND	ug/L	Water	NA	10
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Phenanthrene	85-01-8		2.26	224.38		ng/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Phenol	108-95-2	10	0.45	25		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Phenol	108-95-2	10	0.45	23		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Phenol	108-95-2	20	0.9	31		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Phenol	108-95-2	11	0.48	20		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Phenol	108-95-2	10	0.45	20		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Phenol	108-95-2	50	2.3	34	J	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Phenol	108-95-2	25.8	3.05	13.7	J	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Phenol	108-95-2	50	5.9	ND	ND	µg/L	Water	NA	10
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Phenol	108-95-2	498	59	ND	ND	ug/L	Water	NA	100
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Phenol	108-95-2	99	11.8	54.5	J	ug/L	Water	NA	20
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Phenol	108-95-2	5	0.63	30		ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Phenol	108-95-2	1.3	0.32	6.9		ug/L	Water	NA	5
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Phenol	108-95-2	3.8	0.22	8.4		ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Phenol	108-95-2	4	0.43	15		ug/L	Water	NA	20
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Phenol	108-95-2	4.7	0.53	9.7		ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Phenol	108-95-2	3.8	0.43	6		ug/L	Water	NA	20
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Phenol	108-95-2	20	0.53	15	J	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Phenol	108-95-2	8	0.22	13		ug/L	Water	NA	10
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Phorate	298-02-2	NA	0.00135		U G	ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Phosmet	732-11-6	NA	0.00466		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pesticides	Pirimiphos-Methyl	29232-93-7	NA	0.00037		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Prednisolone	50-24-8	NA	0.00576		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Prednisolone	50-24-8	3.97	NA	9.31		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Prednisone	53-03-2	NA	0.366	0.404		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Prednisone	53-03-2	5.96	NA	7.29		ng/L	Aqueous	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Progesterone	57-83-0	1.04	NA	56.6		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Promethazine	60-87-7	NA	0.00232		U D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Promethazine	60-87-7	0.298	NA	33.5		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Propoxyphene	469-62-5	NA	0.00161	0.0102	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Propoxyphene	469-62-5	0.298	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Propranolol	525-66-6	NA	0.00411	0.0611		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Propranolol	525-66-6	0.298	NA	74.8		ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	625		SVOCs/PAHs	Pyrene	129-00-0	10	0.47	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	625		SVOCs/PAHs	Pyrene	129-00-0	10	0.47	ND	ND	µg/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Pyrene	129-00-0		1.37348	176.48		ng/l	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	625		SVOCs/PAHs	Pyrene	129-00-0	20	0.94	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	625		SVOCs/PAHs	Pyrene	129-00-0	11	0.51	ND	ND	µg/L	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Pyrene	129-00-0		1.37348	97.761		ng/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-002	MOA17ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	625		SVOCs/PAHs	Pyrene	129-00-0	10	0.47	0.47	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-002	MOA17ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	625		SVOCs/PAHs	Pyrene	129-00-0	50	2.4	ND	ND	µg/L	Water	NA	5
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Pyrene	129-00-0		1.37348	187.28		ng/L	Water	NA	10
2018	ALS Environmental - FL	J1804695-002	MOA18SVL002	SummerDry	Effluent	Final Effluent	SAMP	06/26/2018	625.1		SVOCs/PAHs	Pyrene	129-00-0	25.8	3.82	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-002	MOA18SVL004	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	625.1		SVOCs/PAHs	Pyrene	129-00-0	50	7.4	ND	ND	µg/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Pyrene	129-00-0		1.37348	240.29		ng/L	Water	NA	1
2019	ALS Environmental - WA	J1903474-002	M19D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	625.1		SVOCs/PAHs	Pyrene	129-00-0	99	14.8	ND	ND	ug/L	Water	NA	20
2019	ALS Environmental - WA	J1905387-002	M19W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	625.1		SVOCs/PAHs	Pyrene	129-00-0	498	74	ND	ND	ug/L	Water	NA	100
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Pyrene	129-00-0		1.37	104.7		ng/L	Water	NA	1
2020	ALS Environmental - WA	K2005324-012	M20D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	625.1		SVOCs/PAHs	Pyrene	129-00-0	2	0.19	0.26	J	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2006868-012	M20W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	625.1		SVOCs/PAHs	Pyrene	129-00-0	0.5	0.095	0.1	J	ug/L	Water	NA	5
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Pyrene	129-00-0		1.37	127.67		ng/L	Water	NA	1
2021	ALS Environmental - WA	K2106727-012	M21D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	625.1		SVOCs/PAHs	Pyrene	129-00-0	3.8	0.9	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-012	M21W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	625.1		SVOCs/PAHs	Pyrene	129-00-0	4	1.8	ND	ND	ug/L	Water	NA	20
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Pyrene	129-00-0		1.37	134.42		ng/L	Water	NA	1
2022	ALS Environmental - WA	K2206847-010	M22D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	625.1		SVOCs/PAHs	Pyrene	129-00-0	4.7	2.3	ND	ND	ug/L	Water	NA	25
2022	ALS Environmental - WA	K2209208-010	M22W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	625.1		SVOCs/PAHs	Pyrene	129-00-0	3.8	1.8	ND	ND	ug/L	Water	NA	20
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Pyrene	129-00-0		1.37	91.334		ng/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-010	M23D-SVL-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	625.1		SVOCs/PAHs	Pyrene	129-00-0	20	2.3	ND	ND	ug/L	Water	NA	25
2023	ALS Environmental - WA	K2309239-010	M23W-SVL-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	625.1		SVOCs/PAHs	Pyrene	129-00-0	8	0.9	ND	ND	ug/L	Water	NA	10
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Pyrene	129-00-0		1.37	110.24		ng/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Quintozene	82-68-8	NA	0.00012		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Ranitidine	66357-35-5	NA	0.00179	0.0844	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Ranitidine	66357-35-5	2.98	NA	ND	U	ng/L	Aqueous	NA	NA

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Retene	483-65-8		1.59375	ND	ND	ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Retene	483-65-8		1.59375	8.1995		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Retene	483-65-8		1.59375	8.7356	J	ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Retene	483-65-8		1.59375	8.263		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Retene	483-65-8		1.59	10.784		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Retene	483-65-8		1.59	9.725		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Retene	483-65-8		1.59	9.197		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Retene	483-65-8		1.59	9.098		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Retene	483-65-8		1.59	9.585		ng/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Roxithromycin	80214-83-1	NA	0.00029		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Roxithromycin	80214-83-1	0.206	NA	0.941		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Sarafloxacin	98105-99-8	NA	0.0144		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Sarafloxacin	98105-99-8	2.98	NA	ND	U	ng/L	Aqueous	NA	NA
2019	ALS Environmental - WA	K1905862-008	M19D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.8	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-013	M19D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.9	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-023	M19D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.8	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-003	M19W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-008	M19W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-018	M19W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-003	M20D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-018	M20D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-028	M20D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.8	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	KQ2011526-03	M20W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	Lab Dup	8/10/2020	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.9	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-013	M20W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.9	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-023	M20W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.8	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-008	M21D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-016	M21D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-024	M21D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-008	M21W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.9	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-016	M21W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.8	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-024	M21W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.8	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-008	M22D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-016	M22D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-024	M22D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	KQ2213818-05	M22W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	Lab Dup	8/8/2022	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-016	M22W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.6	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-024	M22W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-002	M23D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-06	M23D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	Lab Dup	6/22/2023	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.8	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-006	M23D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.9	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-008	M23W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.5	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-016	M23W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-024	M23W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.5	J	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-006	MOA15TML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.6	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-018	MOA15TML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.6	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-002	MOA15TML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.8	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-007	MOA15TML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.9	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-003	MOA15TML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	0.9	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-013	MOA15TML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	1	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-006	MOA16TML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	0.9	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-002	MOA16TML004	SummerDry	Effluent	Final Effluent	SAMP	06/23/2016	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	0.8	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-012	MOA16TML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	0.8	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-006	MOA16TML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	1	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609312-002	MOA16TML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	0.9	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-002	MOA16TML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	0.9	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-002	MOA17TML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	1.2		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-002	MOA17TML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	0.9	J	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2017	ALS Environmental - WA	K1705997-002	MOA17TML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	1.2		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-008	MOA17TML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	1.1		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-041	MOA17TML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	1.1		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-051	MOA17TML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Total	Metals	Selenium	7782-49-2	1	0.4	1.1		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-004	MOA18TML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.8	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-014	MOA18TML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.9	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-024	MOA18TML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.8	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-004	MOA18TML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	1	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-014	MOA18TML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.7	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-024	MOA18TML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Total	Metals	Selenium	7782-49-2	1	0.2	0.9	J	µg/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Sertraline	79617-96-2	NA	0.0012	0.108	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Sertraline	79617-96-2	0.298	NA	48.3		ng/L	Aqueous	NA	NA
2019	ALS Environmental - WA	KQ1908740-03	M19D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/19/2019	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.238		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-013	M19D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.2		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-023	M19D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.255		ug/L	Water	NA	1
2019	Brooks Applied Labs	1925069-18	M19R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1640 RP	Total	Metals	Silver	7440-22-4	0.05	0.017	0.111		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-003	M19W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.201		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-008	M19W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.223		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-018	M19W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.174		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-003	M20D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.33		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-018	M20D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.191		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-028	M20D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.136	J+,B	ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-02RE2	M20R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Total	Metals	Silver	7440-22-4	0.1	0.038	0.097	J	ug/L	Water	NA	2
2020	ALS Environmental - WA	K2006972-003	M20W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.231		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-013	M20W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.267		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-023	M20W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.204		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-008	M21D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.144		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-016	M21D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.137		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-024	M21D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.182		ug/L	Water	NA	1
2021	Brooks Applied Labs	2106131-18	M21R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Total	Metals	Silver	7440-22-4	0.05	0.019	0.1		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-008	M21W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.182		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-016	M21W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.217		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-024	M21W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.185		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-008	M22D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.148		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-016	M22D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.155		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-024	M22D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.159		ug/L	Water	NA	1
2022	Brooks Applied Labs	B222759-DUP2	M22R-MTT-EF	RecWater	Effluent	Final Effluent	Lab Dup	06/16/2022	ICP-MS	Total	Metals	Silver	7440-22-4	0.15	0.05	0.145	J	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2209249-008	M22W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.191		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-016	M22W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.121		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-024	M22W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.161		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-04	M23D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/21/2023	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.165		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-06	M23D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	Lab Dup	6/22/2023	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.148		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-006	M23D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.121		ug/L	Water	NA	1
2023	Brooks Applied Labs	2306399-18	M23R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1638M	Total	Metals	Silver	7440-22-4	0.15	0.05	0.096	J	ug/L	Water	NA	10
2023	ALS Environmental - WA	K2309291-008	M23W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.165		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-016	M23W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.2		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-024	M23W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Total	Metals	Silver	7440-22-4	0.02	0.009	0.18		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-006	MOA15TML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Total	Metals	Silver	7440-22-4	0.02	0.002	0.366		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-018	MOA15TML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Total	Metals	Silver	7440-22-4	0.02	0.002	0.24		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-002DUP	MOA15TML006	SummerDry	Effluent	Final Effluent	Lab Dup	06/18/2015	200.8	Total	Metals	Silver	7440-22-4	0.02	0.002	0.339		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-007	MOA15TML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Total	Metals	Silver	7440-22-4	0.02	0.002	0.156		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-003	MOA15TML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Total	Metals	Silver	7440-22-4	0.02	0.005	0.291		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-013	MOA15TML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Total	Metals	Silver	7440-22-4	0.02	0.005	0.261		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-006	MOA16TML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Total	Metals	Silver	7440-22-4	0.02	0.005	0.211		µg/L	Water	NA	1
2016	ALS Environmental - WA	KQ1608088-05	MOA16TML004	SummerDry	Effluent	Final Effluent	Lab Dup	06/23/2016	200.8	Total	Metals	Silver	7440-22-4	0.02	0.005	0.483		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-012	MOA16TML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Total	Metals	Silver	7440-22-4	0.02	0.005	0.445		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-006	MOA16TML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Total	Metals	Silver	7440-22-4	0.02	0.003	0.267		µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2016	ALS Environmental - WA	K1609312-002	MOA16TML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Total	Metals	Silver	7440-22-4	0.02	0.003	0.249		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-002	MOA16TML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Total	Metals	Silver	7440-22-4	0.02	0.003	0.19		µg/L	Water	NA	1
2016	Brooks Applied Labs	1626048-22	MOA16TMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Total	Metals	Silver	7440-22-4	0.05	0.017	0.124		µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-17	MOA17DMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Total	Metals	Silver	7440-22-4	0.05	0.017	0.297		µg/L	Water	NA	1
2017	ALS Environmental - WA	KQ1707755-05	MOA17TML002	SummerDry	Effluent	Final Effluent	Lab Dup	06/07/2017	200.8	Total	Metals	Silver	7440-22-4	0.02	0.003	0.402		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-002	MOA17TML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Total	Metals	Silver	7440-22-4	0.02	0.003	0.282		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-002	MOA17TML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Total	Metals	Silver	7440-22-4	0.02	0.003	0.268		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-008	MOA17TML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Total	Metals	Silver	7440-22-4	0.02	0.003	0.335		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-041	MOA17TML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Total	Metals	Silver	7440-22-4	0.02	0.003	0.315		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-051	MOA17TML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Total	Metals	Silver	7440-22-4	0.02	0.003	0.337		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-004	MOA18TML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Total	Metals	Silver	7440-22-4	0.02	0.008	0.49		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-014	MOA18TML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Total	Metals	Silver	7440-22-4	0.02	0.008	0.37		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-024	MOA18TML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Total	Metals	Silver	7440-22-4	0.02	0.008	0.288		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-004	MOA18TML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Total	Metals	Silver	7440-22-4	0.02	0.002	0.327		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-014	MOA18TML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Total	Metals	Silver	7440-22-4	0.02	0.002	0.288		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-024	MOA18TML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Total	Metals	Silver	7440-22-4	0.02	0.002	0.436		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-16RE3	MOA18TMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Total	Metals	Silver	7440-22-4	0.05	0.017	0.263		µg/L	Water	NA	1
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Simazine	122-34-9	NA	0.00204		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Simvastatin	79902-63-9	NA	0.0192		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Simvastatin	79902-63-9	2	NA	ND	U	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Styrene	100-42-5	0.5	0.023	0.29	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Styrene	100-42-5	0.5	0.023	ND	UB	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Styrene	100-42-5	0.5	0.023	ND	UB	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Styrene	100-42-5	0.5	0.023	5.5		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Styrene	100-42-5	0.5	0.023	0.16	J	µg/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Styrene	100-42-5	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Styrene	100-42-5	0.5	0.01	0.07	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Styrene	100-42-5	0.5	0.05	0.06	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Styrene	100-42-5	5	0.05	0.09	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Styrene	100-42-5	0.5	0.05	0.37	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Styrene	100-42-5	0.5	0.05	0.38	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Styrene	100-42-5	0.5	0.05	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Styrene	100-42-5	5	0.05	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Sulfachloropyridazine	80-32-0	NA	0.00144		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Sulfachloropyridazine	80-32-0	0.596	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Sulfadiazine	68-35-9	NA	0.00144		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Sulfadiazine	68-35-9	0.596	NA	1.46		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Sulfadimethoxine	122-11-2	NA	0.00267		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Sulfadimethoxine	122-11-2	0.305	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Sulfamerazine	127-79-7	NA	0.00328		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Sulfamerazine	127-79-7	0.596	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Sulfamethazine	57-68-1	NA	0.00661		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Sulfamethazine	57-68-1	0.596	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Sulfamethizole	144-82-1	NA	0.002	0.0051		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Sulfamethizole	144-82-1	1.01	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Sulfamethoxazole	723-46-6	NA	0.00581	1.08		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Sulfamethoxazole	723-46-6	0.596	NA	416		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Sulfanilamide	63-74-1	NA	0.015	0.0348		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Sulfanilamide	63-74-1	5.96	NA	32.3		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Sulfathiazole	72-14-0	NA	0.00312		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Sulfathiazole	72-14-0	1.49	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Tecnazene	117-18-0	NA	0.00012		U	ug/L	Water	NA	NA
2010	AXYS	NA	EFFMRES-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pesticides	Terbufos	13071-79-9	NA	0.00069		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Testosterone	58-22-0	5.63	NA	71.7		ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Tetrachloroethene (PCE)	127-18-4	0.5	0.032	0.29	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Tetrachloroethene (PCE)	127-18-4	0.5	0.032	ND	ND	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Tetrachloroethene (PCE)	127-18-4	0.5	0.032	0.31	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Tetrachloroethene (PCE)	127-18-4	0.5	0.032	0.6		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Tetrachloroethene (PCE)	127-18-4	0.5	0.032	0.39	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Tetrachloroethene (PCE)	127-18-4	0.5	0.032	0.32	J	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Tetrachloroethene (PCE)	127-18-4	5	1.1	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Tetrachloroethene (PCE)	127-18-4	1	0.22	0.25	J	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Tetrachloroethene (PCE)	127-18-4	5	1.1	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Tetrachloroethene (PCE)	127-18-4	5	1.1	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Tetrachloroethene (PCE)	127-18-4	0.5	0.01	ND	UB	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Tetrachloroethene (PCE)	127-18-4	0.5	0.01	0.05	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Tetrachloroethene (PCE)	127-18-4	0.5	0.05	0.23	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Tetrachloroethene (PCE)	127-18-4	5	0.05	0.17	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Tetrachloroethene (PCE)	127-18-4	0.5	0.05	0.08	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Tetrachloroethene (PCE)	127-18-4	0.5	0.05	0.57		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Tetrachloroethene (PCE)	127-18-4	0.5	0.05	0.2	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Tetrachloroethene (PCE)	127-18-4	5	0.05	0.18	J	ug/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Tetracycline [TC]	60-54-8	NA	0.00755	0.0979		ug/L	Water	NA	NA
2019	ALS Environmental - WA	K1905862-008	M19D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	0.015	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-013	M19D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-023	M19D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1909781-003	M19W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	0.02	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-008	M19W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	0.019	J	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-018	M19W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	KQ2008836-03	M20D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/24/2020	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	0.015	J	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-018	M20D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-028	M20D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-003	M20W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-013	M20W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-023	M20W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-008	M21D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-016	M21D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-024	M21D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-008	M21W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-016	M21W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-024	M21W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-008	M22D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	0.052		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-016	M22D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-024	M22D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-008	M22W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-016	M22W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	0.012	J	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-024	M22W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-002	M23D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	0.015	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-004	M23D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/22/2023	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	0.015	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-006	M23D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	0.011	J	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-008	M23W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-016	M23W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-024	M23W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.009	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-006	MOA15TML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-018	MOA15TML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-002	MOA15TML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-007	MOA15TML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-003	MOA15TML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-013	MOA15TML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-006	MOA16TML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	0.004	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	KQ1608088-05	MOA16TML004	SummerDry	Effluent	Final Effluent	Lab Dup	06/23/2016	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	0.004	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-012	MOA16TML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	0.003	J	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-006	MOA16TML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	0.005	J	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2016	ALS Environmental - WA	K1609312-002	MOA16TML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-002	MOA16TML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-002	MOA17TML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-002	MOA17TML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705997-002	MOA17TML006	SummerDry	Effluent	Final Effluent	SAMP	06/09/2017	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	KQ1711770-05	MOA17TML008	SummerWet	Effluent	Final Effluent	Lab Dup	08/08/2017	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	0.012	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-041	MOA17TML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	ND	UB	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-051	MOA17TML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.002	ND	UB	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-004	MOA18TML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.008	0.009	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-014	MOA18TML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-024	MOA18TML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-004	MOA18TML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.008	0.018	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-014	MOA18TML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.008	0.008	J	µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-024	MOA18TML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Total	Metals	Thallium	7440-28-0	0.02	0.008	ND	ND	µg/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Theophylline	58-55-9	NA	0.259	51.1		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Theophylline	58-55-9	9.28	NA	48400	J	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Thiabendazole	148-79-8	NA	0.0023	0.024		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Thiabendazole	148-79-8	0.298	NA	30.6		ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Toluene	108-88-3	0.5	0.032	7.5		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506653-001	MOA15VOA008	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	624		VOCs	Toluene	108-88-3	0.5	0.032	6.4		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Toluene	108-88-3	0.5	0.032	16		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607039-001	MOA16VOA008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	624		VOCs	Toluene	108-88-3	0.5	0.032	7.6		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Toluene	108-88-3	0.5	0.032	8.3		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Toluene	108-88-3	0.5	0.032	9		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Toluene	108-88-3	0.5	0.032	7.2		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1706002-001	MOA17VOA008	RecWater	Effluent	Final Effluent	SAMP	06/06/2017	624		VOCs	Toluene	108-88-3	0.5	0.032	6.7		µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Toluene	108-88-3	0.5	0.032	8		µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Toluene	108-88-3	5	0.95	14.7		µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Toluene	108-88-3	1	0.19	6.68		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806164-001	MOA18VOA008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 624		VOCs	Toluene	108-88-3	0.5	0.032	16		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905864-001	M19R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	EPA 624		VOCs	Toluene	108-88-3	0.5	0.032	5.3		ug/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Toluene	108-88-3	5	0.95	6.65		ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Toluene	108-88-3	5	0.95	5.2		ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005387-010	M20R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	624.1		VOCs	Toluene	108-88-3	0.5	0.01	6		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Toluene	108-88-3	0.5	0.01	7.9		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Toluene	108-88-3	0.5	0.01	4.4		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106804-001	M21R-VOA-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Toluene	108-88-3	0.5	0.07	3.8		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Toluene	108-88-3	0.5	0.07	6		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Toluene	108-88-3	5	0.07	6.5		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Toluene	108-88-3	0.5	0.07	8.5		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Toluene	108-88-3	0.5	0.07	5.7		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Toluene	108-88-3	0.5	0.07	5.6		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Toluene	108-88-3	5	0.07	7.7		ug/L	Water	NA	1
2015	TDI Brooks	RCA1008.D	MOA15PAH007	RecWater	Effluent	Final Effluent	SAMP	06/16/2015	PAH-2014.M		SVOCs/PAHs	Total PAHs	NA			7614.7		ng/l	Water	NA	1
2016	TDI Brooks	RCA1019.D	MOA16PAH008	RecWater	Effluent	Final Effluent	SAMP	6/21/2016	B&B SOP1006		SVOCs/PAHs	Total PAHs	NA			5530.5		ng/L	Water	NA	1
2017	TDI Brooks	RCA1030B.D	MOA17PAH008	RecWater	Effluent	Final Effluent	SAMP	06/06/17	B&B SOP1006		SVOCs/PAHs	Total PAHs	NA			4938.5		ng/L	Water	NA	10
2018	TDI Brooks	RCA1048.D	MOA18PAH009	RecWater	Effluent	Final Effluent	SAMP	8/23/2018	B&B SOP1006		SVOCs/PAHs	Total PAHs	NA			8177.9		ng/L	Water	NA	1
2019	TDI Brooks	RCA1060.D	M19R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/18/2019	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Total PAHs	NA			4327.8		ng/L	Water	NA	1
2020	TDI Brooks	RCA1071.D	M20R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/24/2020	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Total PAHs	NA			5319.7		ng/L	Water	NA	1
2021	TDI Brooks	RCA1082.D	M21R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/8/2021	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Total PAHs	NA			7010.8		ng/L	Water	NA	1
2022	TDI Brooks	RCA1093.D	M22R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/17/2022	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Total PAHs	NA			4204.2		ng/L	Water	NA	1
2023	TDI Brooks	RCA1104.D	M23R-PAH-EF	RecWater	Effluent	Final Effluent	SAMP	6/20/2023	SOP1006 (SIM 625 Mod)		SVOCs/PAHs	Total PAHs	NA			4884.3		ng/L	Water	NA	1
2016	AWWU	AB13781	MOA16TSS008	RecWater	Effluent	Final Effluent	SAMP	06/22/2016	SM 2540D	TSS		Total Suspended Solids (TSS)	NA			70		mg/L	Water	NA	1
2018	AWWU	AB25447	MOA18TSS008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	SM 2540D	TSS		Total Suspended Solids (TSS)	NA			64		mg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-002	MOA15ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	8081B		Pesticides	Toxaphene	8001-35-2	0.97	0.97	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-002	MOA15ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	8081B		Pesticides	Toxaphene	8001-35-2	0.66	0.66	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-002	MOA16ORG002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	8081B		Pesticides	Toxaphene	8001-35-2	1.5	1.5	ND	ND	µg/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2016	ALS Environmental - WA	K1609222-002	MOA16ORG004	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	8081B		Pesticides	Toxaphene	8001-35-2	0.52	0.44	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705876-004	MOA17POC002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	8081B		Pesticides	Toxaphene	8001-35-2	2	2	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-004	MOA17POC004	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	8081B		Pesticides	Toxaphene	8001-35-2	0.5	0.24	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-06-2077-2	MOA18POC002	SummerDry	Effluent	Final Effluent	SAMP	06/26/18	EPA 8081A		Pesticides	Toxaphene	8001-35-2	2	0.6	ND	ND	µg/L	Water	NA	1
2018	Eurofins Calscience, Inc.	18-08-1834-2	MOA18POC005	SummerWet	Effluent	Final Effluent	SAMP	08/21/18	EPA 8081A		Pesticides	Toxaphene	8001-35-2	2.1	0.62	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	K1905790-002	M19D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	8081B		Pesticides	Toxaphene	8001-35-2	2	2	ND	ND	ug/L	Water	NA	10
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	Toxaphene	8001-35-2	1.3	0.48	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2005324-008	M20D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	608.3		Pesticides	Toxaphene	8001-35-2	0.55	0.55	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	Toxaphene	8001-35-2	5.6	5.6	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	Toxaphene	8001-35-2	4.8	0.49	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	Toxaphene	8001-35-2	4.8		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	Toxaphene	8001-35-2	0.5	0.5	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	Toxaphene	8001-35-2	0.5	0.5	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	Toxaphene	8001-35-2	0.5	0.5	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	Toxaphene	8001-35-2	0.5	0.5	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	trans-1,2-Dichloroethene	156-60-5	0.5	0.032	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	trans-1,2-Dichloroethene	156-60-5	0.5	0.032	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	trans-1,2-Dichloroethene	156-60-5	0.5	0.032	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	trans-1,2-Dichloroethene	156-60-5	0.5	0.032	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	trans-1,2-Dichloroethene	156-60-5	0.5	0.032	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	trans-1,2-Dichloroethene	156-60-5	0.5	0.032	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	trans-1,2-Dichloroethene	156-60-5	5	0.95	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	trans-1,2-Dichloroethene	156-60-5	1	0.19	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	trans-1,2-Dichloroethene	156-60-5	5	0.95	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	trans-1,2-Dichloroethene	156-60-5	5	0.95	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	trans-1,2-Dichloroethene	156-60-5	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	trans-1,2-Dichloroethene	156-60-5	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	trans-1,2-Dichloroethene	156-60-5	0.5	0.07	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	trans-1,2-Dichloroethene	156-60-5	5	0.07	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	trans-1,2-Dichloroethene	156-60-5	0.5	0.07	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	trans-1,2-Dichloroethene	156-60-5	0.5	0.07	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	trans-1,2-Dichloroethene	156-60-5	0.5	0.07	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	trans-1,2-Dichloroethene	156-60-5	5	0.07	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	trans-1,3-Dichloropropene	10061-02-6	0.5	0.045	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	trans-1,3-Dichloropropene	10061-02-6	0.5	0.045	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	trans-1,3-Dichloropropene	10061-02-6	0.5	0.045	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	trans-1,3-Dichloropropene	10061-02-6	0.5	0.045	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	trans-1,3-Dichloropropene	10061-02-6	0.5	0.045	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	trans-1,3-Dichloropropene	10061-02-6	0.5	0.045	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	trans-1,3-Dichloropropene	10061-02-6	5	1.15	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	trans-1,3-Dichloropropene	10061-02-6	1	0.23	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	trans-1,3-Dichloropropene	10061-02-6	5	1.15	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	trans-1,3-Dichloropropene	10061-02-6	5	1.15	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	trans-1,3-Dichloropropene	10061-02-6	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	trans-1,3-Dichloropropene	10061-02-6	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	trans-1,3-Dichloropropene	10061-02-6	0.5	0.09	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	trans-1,3-Dichloropropene	10061-02-6	5	0.09	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	trans-1,3-Dichloropropene	10061-02-6	0.5	0.09	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	trans-1,3-Dichloropropene	10061-02-6	0.5	0.09	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	trans-1,3-Dichloropropene	10061-02-6	0.5	0.09	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	trans-1,3-Dichloropropene	10061-02-6	5	0.09	ND	ND	ug/L	Water	NA	1
2019	ALS Environmental - WA	K1908294-002	M19W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	8081B		Pesticides	trans-Chlordane	5103-74-2	0.025	0.0053	ND	ND	ug/L	Water	NA	10
2020	ALS Environmental - WA	K2006868-008	M20W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	608.3		Pesticides	trans-Chlordane	5103-74-2	0.056	0.056	ND	ND	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2108795-004	M21W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	608.3		Pesticides	trans-Chlordane	5103-74-2	0.048	0.0054	ND	ND,H	ug/L	Water	NA	10
2021	ALS Environmental - WA	K2106727-004	M21D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	608.3		Pesticides	trans-Chlordane	5103-74-2	0.048		ND	ND	ug/L	Water	NA	10
2022	ALS Environmental - WA	K2206847-002	M22D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	608.3		Pesticides	trans-Chlordane	5103-74-2	0.005	0.005	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209208-002	M22W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	608.3		Pesticides	trans-Chlordane	5103-74-2	0.005	0.005	ND	ND	ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2023	ALS Environmental - WA	K2307112-002	M23D-POC-EF	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	608.3		Pesticides	trans-Chlordane	5103-74-2	0.005	0.005	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309239-002	M23W-POC-EF	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	608.3		Pesticides	trans-Chlordane	5103-74-2	0.005	0.005	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Trenbolone	10161-33-8	NA	0.00384		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Trenbolone	10161-33-8	2	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Trenbolone acetate	10161-34-9	NA	0.00178		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Trenbolone acetate	10161-34-9	0.298	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Triamterene	396-01-0	NA	0.00089	0.0941	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Triamterene	396-01-0	1.49	NA	34.9	D	ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Trichloroethene (TCE)	79-01-6	0.5	0.044	0.07	J	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Trichloroethene (TCE)	79-01-6	0.5	0.044	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Trichloroethene (TCE)	79-01-6	0.5	0.044	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Trichloroethene (TCE)	79-01-6	0.5	0.044	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Trichloroethene (TCE)	79-01-6	0.5	0.044	0.06	J	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Trichloroethene (TCE)	79-01-6	0.5	0.044	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Trichloroethene (TCE)	79-01-6	5	1.8	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,3	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Trichloroethene (TCE)	79-01-6	1	0.36	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Trichloroethene (TCE)	79-01-6	5	1.8	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Trichloroethene (TCE)	79-01-6	5	1.8	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Trichloroethene (TCE)	79-01-6	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Trichloroethene (TCE)	79-01-6	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Trichloroethene (TCE)	79-01-6	0.5	0.08	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Trichloroethene (TCE)	79-01-6	5	0.08	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Trichloroethene (TCE)	79-01-6	0.5	0.08	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Trichloroethene (TCE)	79-01-6	0.5	0.08	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Trichloroethene (TCE)	79-01-6	0.5	0.08	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Trichloroethene (TCE)	79-01-6	5	0.08	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Trichlorofluoromethane	75-69-4	0.5	0.08	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Trichlorofluoromethane	75-69-4	0.5	0.08	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Trichlorofluoromethane	75-69-4	0.5	0.048	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Trichlorofluoromethane	75-69-4	0.5	0.048	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Trichlorofluoromethane	75-69-4	0.5	0.048	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Trichlorofluoromethane	75-69-4	0.5	0.048	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Trichlorofluoromethane	75-69-4	100	1.2	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,3	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Trichlorofluoromethane	75-69-4	20	0.24	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Trichlorofluoromethane (CFC 11)	75-69-4	100	1.2	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Trichlorofluoromethane (CFC 11)	75-69-4	100	1.2	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Trichlorofluoromethane (CFC 11)	75-69-4	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Trichlorofluoromethane (CFC 11)	75-69-4	0.5	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Trichlorofluoromethane (CFC 11)	75-69-4	0.5	0.07	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Trichlorofluoromethane (CFC 11)	75-69-4	5	0.07	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Trichlorofluoromethane (CFC 11)	75-69-4	0.5	0.07	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Trichlorofluoromethane (CFC 11)	75-69-4	0.5	0.07	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Trichlorofluoromethane (CFC 11)	75-69-4	0.5	0.07	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Trichlorofluoromethane (CFC 11)	75-69-4	5	0.07	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Trichlorotrifluoroethane	75-69-4	5	0.074	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Trichlorotrifluoroethane	75-69-4	5	0.074	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Trichlorotrifluoroethane	75-69-4	5	0.034	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Trichlorotrifluoroethane	75-69-4	5	0.034	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Trichlorotrifluoroethane	75-69-4	5	0.034	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Trichlorotrifluoroethane	75-69-4	5	0.034	ND	ND	µg/L	Water	NA	1
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Triclocarban	101-20-2	1.19	NA	4.89	D	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Triclosan	3380-34-5	NA	0.102	4.31		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Triclosan	3380-34-5	17.9	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Trimethoprim	738-70-5	NA	0.00167	0.711		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Trimethoprim	738-70-5	0.357	NA	294		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Tylosin	1401-69-0	NA	0.00576		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Tylosin	1401-69-0	0.596	NA	1.43		ng/L	Aqueous	NA	NA

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2010	AXYS	NA	EFFPPCP-AP (Duplicate)	NA	Effluent	Final Effluent	Dup	05/21/2010	NA	NA	Pharmaceuticals	Valsartan	137862-53-4	NA	0.0206	15.8		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Valsartan	137862-53-4	3.97	NA	2480		ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Verapamil	52-53-9	NA	0.00058	0.0512	D	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Verapamil	52-53-9	0.149	NA	10.3		ng/L	Aqueous	NA	NA
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Vinyl Acetate	108-05-4	10	0.33	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Vinyl Acetate	108-05-4	10	0.33	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Vinyl Acetate	108-05-4	10	0.33	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Vinyl Acetate	108-05-4	10	0.33	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Vinyl Acetate	108-05-4	10	0.33	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Vinyl Acetate	108-05-4	10	0.33	ND	ND	µg/L	Water	NA	1
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Vinyl Acetate	108-05-4	10	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Vinyl Acetate	108-05-4	10	0.01	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Vinyl Acetate	108-05-4	10	0.3	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Vinyl Acetate	108-05-4	10	0.3	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Vinyl Acetate	108-05-4	10	0.3	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Vinyl Acetate	108-05-4	10	0.3	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Vinyl Acetate	108-05-4	10	0.3	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Vinyl Acetate	108-05-4	10	0.3	ND	ND	ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506650-009	MOA15VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	624		VOCs	Vinyl Chloride	75-01-4	0.5	0.031	ND	ND	µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509292-009	MOA15VOPCOMP	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	624		VOCs	Vinyl Chloride	75-01-4	0.5	0.031	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607048-009	MOA16VOP009-016Comp	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	624		VOCs	Vinyl Chloride	75-01-4	0.5	0.031	ND	ND	µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609228-009	MOA16VOP028-035Comp	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	624		VOCs	Vinyl Chloride	75-01-4	0.5	0.031	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1705871-009	MOA17VOPComposite	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	624		VOCs	Vinyl Chloride	75-01-4	0.5	0.031	ND	ND	µg/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-037	MOA17VOP EFF COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	624		VOCs	Vinyl Chloride	75-01-4	0.5	0.031	ND	ND	µg/L	Water	NA	1
2018	ALS Environmental - FL	J1804695-004	MOA18VOP009-016	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	624.1		VOCs	Vinyl Chloride	75-01-4	5	1.8	ND	ND	µg/L	Water	NA	5
2018	ALS Environmental - FL	J1806088-004	MOA18VOP028,29,30,31,32,33,34,35	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	624.1		VOCs	Vinyl Chloride	75-01-4	1	0.36	ND	ND	µg/L	Water	NA	1
2019	ALS Environmental - WA	J1903535-002	M19D-VOP-EF-C1-C8	SummerDry	Effluent	Final Effluent	SAMP	6/19/2019	624.1		VOCs	Vinyl Chloride	75-01-4	5	1.8	ND	ND	ug/L	Water	NA	5
2019	ALS Environmental - WA	J1905386-001	M19W-VOP-EF-C1-C8	SummerWet	Effluent	Final Effluent	SAMP	9/10/2019	624.1		VOCs	Vinyl Chloride	75-01-4	5	1.8	ND	ND	ug/L	Water	NA	5
2020	ALS Environmental - WA	K2005319-009	M20D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/23/2020	624.1		VOCs	Vinyl Chloride	75-01-4	0.5	0.01	ND	ND	ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006867-009	M20W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	624.1		VOCs	Vinyl Chloride	75-01-4	0.5	0.01	0.02	J	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106723-018	M21D-VOP-EF-C COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/8/2021	624.1		VOCs	Vinyl Chloride	75-01-4	0.5	0.09	ND	ND	ug/L	Water	NA	1
2021	ALS Environmental - WA	K2108798-018	M21W-VOP-EF-C COMPOSITE	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	624.1		VOCs	Vinyl Chloride	75-01-4	5	0.09	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206855-018	M22D-VOC-EF-C Composite	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	624.1		VOCs	Vinyl Chloride	75-01-4	0.5	0.09	ND	ND	ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209197-009	M22W-VOP-EF-C Composite	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	624.1		VOCs	Vinyl Chloride	75-01-4	0.5	0.09	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307115-018	M23D-VOC-EF-C-COMPOSITE	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	624.1		VOCs	Vinyl Chloride	75-01-4	0.5	0.09	ND	ND	ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309237-018	M23W-VOC-EF-C-Composite	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	624.1		VOCs	Vinyl Chloride	75-01-4	5	0.09	ND	ND	ug/L	Water	NA	1
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Virginiamycin	11006-76-1	NA	0.00288		U	ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Virginiamycin M1	21411-53-0	2.18	NA	ND	U	ng/L	Aqueous	NA	NA
2010	AXYS	NA	EFFPPCP-AP	NA	Effluent	Final Effluent	SAMP	05/21/2010	NA	NA	Pharmaceuticals	Warfarin	81-81-2	NA	0.00216	0.004		ug/L	Water	NA	NA
2023	SGS AXYS - Canada	NA	A23-PCH-EFF	NA	Effluent	Final Effluent	Samp	09/19/2023	S AXYS METHOD MLA-075 Rev	NA	PPCPs	Warfarin	81-81-2	1.19	NA	ND	U	ng/L	Aqueous	NA	NA
2021	ALS Environmental - WA	K2108796-024	M21W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	7/28/2021	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	165		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-006	M23D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/23/2023	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	145		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-023	M20W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/12/2020	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	143		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-013	M19D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/20/2019	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	142		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-013	M20W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/11/2020	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	129		ug/L	Water	NA	1
2023	ALS Environmental - WA	KQ2311554-06	M23D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	Lab Dup	6/22/2023	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	129		ug/L	Water	NA	1
2019	ALS Environmental - WA	K1905862-023	M19D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/21/2019	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	128		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-024	M22D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/17/2022	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	124		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-016	M23W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/16/2023	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	123		ug/L	Water	NA	1
2019	ALS Environmental - WA	KQ1908740-03	M19D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	Lab Dup	6/19/2019	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	119		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-008	M21D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/9/2021	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	119		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-028	M20D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/26/2020	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	118		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-008	M23W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/15/2023	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	118		ug/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-041	MOA17TML010	SummerWet	Effluent	Final Effluent	SAMP	08/09/2017	200.8	Total	Metals	Zinc	7440-66-6	2	0.2	118		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-018	M19W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	9/12/2019	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	116		ug/L	Water	NA	1
2017	ALS Environmental - WA	K1708356-051	MOA17TML012	SummerWet	Effluent	Final Effluent	SAMP	08/10/2017	200.8	Total	Metals	Zinc	7440-66-6	2	0.2	116		µg/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-008	M22D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/15/2022	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	115		ug/L	Water	NA	1

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2020	ALS Environmental - WA	K2005385-018	M20D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/25/2020	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	114		ug/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-024	M21D-TMT-EF-D3	SummerDry	Effluent	Final Effluent	SAMP	6/11/2021	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	113		ug/L	Water	NA	1
2017	ALS Environmental - WA	K1705998-002	MOA17TML002	SummerDry	Effluent	Final Effluent	SAMP	06/07/2017	200.8	Total	Metals	Zinc	7440-66-6	2	0.2	113		µg/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-016	M21W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	7/27/2021	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	111		ug/L	Water	NA	1
2016	ALS Environmental - WA	KQ1608088-05	MOA16TML004	SummerDry	Effluent	Final Effluent	Lab Dup	06/23/2016	200.8	Total	Metals	Zinc	7440-66-6	0.5	0.09	111		µg/L	Water	NA	1
2022	ALS Environmental - WA	K2206850-016	M22D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/16/2022	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	110		ug/L	Water	NA	1
2023	ALS Environmental - WA	K2309291-024	M23W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/17/2023	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	110		ug/L	Water	NA	1
2017	ALS Environmental - WA	KQ1707755-03	MOA17TML006	SummerDry	Effluent	Final Effluent	Lab Dup	06/09/2017	200.8	Total	Metals	Zinc	7440-66-6	2	0.2	110		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-024	MOA18TML012	SummerWet	Effluent	Final Effluent	SAMP	08/23/2018	200.8	Total	Metals	Zinc	7440-66-6	2	0.08	110		µg/L	Water	NA	1
2023	ALS Environmental - WA	K2307253-002	M23D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/21/2023	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	109		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1506718-002	MOA15TML006	SummerDry	Effluent	Final Effluent	SAMP	06/18/2015	200.8	Total	Metals	Zinc	7440-66-6	0.5	0.08	109		µg/L	Water	NA	1
2019	ALS Environmental - WA	K1908450-008	M19W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	9/11/2019	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	107		ug/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-014	MOA18TML004	SummerDry	Effluent	Final Effluent	SAMP	06/28/2018	200.8	Total	Metals	Zinc	7440-66-6	2	0.2	107		µg/L	Water	NA	1
2017	Brooks Applied Labs	1723032-17RE1	MOA17DMT008	RecWater	Effluent	Final Effluent	SAMP	06/07/2017	EPA 1640 RP	Total	Metals	Zinc	7440-66-6	7.5	3.5	106		µg/L	Water	NA	10
2017	ALS Environmental - WA	K1708356-008	MOA17TML008	SummerWet	Effluent	Final Effluent	SAMP	08/08/2017	200.8	Total	Metals	Zinc	7440-66-6	2	0.2	106		µg/L	Water	NA	1
2020	ALS Environmental - WA	K2005385-003	M20D-TMT-EF-D1	SummerDry	Effluent	Final Effluent	SAMP	6/24/2020	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	105		ug/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-004	MOA18TML002	SummerDry	Effluent	Final Effluent	SAMP	06/27/2018	200.8	Total	Metals	Zinc	7440-66-6	2	0.2	105		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-014	MOA18TML010	SummerWet	Effluent	Final Effluent	SAMP	08/22/2018	200.8	Total	Metals	Zinc	7440-66-6	2	0.08	105		µg/L	Water	NA	1
2021	ALS Environmental - WA	K2106802-016	M21D-TMT-EF-D2	SummerDry	Effluent	Final Effluent	SAMP	6/10/2021	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	103		ug/L	Water	NA	1
2017	ALS Environmental - WA	K1705999-002	MOA17TML004	SummerDry	Effluent	Final Effluent	SAMP	06/08/2017	200.8	Total	Metals	Zinc	7440-66-6	2	0.2	103		µg/L	Water	NA	1
2021	ALS Environmental - WA	K2108796-008	M21W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	7/26/2021	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	102		ug/L	Water	NA	1
2019	ALS Environmental - WA	KQ1915567-01	M19W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	Lab Dup	9/10/2019	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	101		ug/L	Water	NA	1
2020	ALS Environmental - WA	K2006972-003	M20W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/10/2020	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	99.5		ug/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-008	M22W-TMT-EF-D1	SummerWet	Effluent	Final Effluent	SAMP	8/8/2022	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	97.7		ug/L	Water	NA	1
2016	ALS Environmental - WA	K1609311-002	MOA16TML012	SummerWet	Effluent	Final Effluent	SAMP	08/11/2016	200.8	Total	Metals	Zinc	7440-66-6	0.5	0.2	96.4		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607065-012	MOA16TML006	SummerDry	Effluent	Final Effluent	SAMP	06/24/2016	200.8	Total	Metals	Zinc	7440-66-6	0.5	0.09	95.5		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1808088-004	MOA18TML008	SummerWet	Effluent	Final Effluent	SAMP	08/21/2018	200.8	Total	Metals	Zinc	7440-66-6	2	0.08	95		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1607011-006	MOA16TML002	SummerDry	Effluent	Final Effluent	SAMP	06/22/2016	200.8	Total	Metals	Zinc	7440-66-6	0.5	0.09	94.4		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-018	MOA15TML004	SummerDry	Effluent	Final Effluent	SAMP	06/17/2015	200.8	Total	Metals	Zinc	7440-66-6	0.5	0.08	93.3		µg/L	Water	NA	1
2016	ALS Environmental - WA	K1609222-006	MOA16TML008	SummerWet	Effluent	Final Effluent	SAMP	08/09/2016	200.8	Total	Metals	Zinc	7440-66-6	0.5	0.2	91		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-013	MOA15TML012	SummerWet	Effluent	Final Effluent	SAMP	08/26/2015	200.8	Total	Metals	Zinc	7440-66-6	0.5	0.09	88.6		µg/L	Water	NA	1
2018	Brooks Applied Labs	1826031-16RE4	MOA18TMT008	RecWater	Effluent	Final Effluent	SAMP	06/27/2018	EPA 1640 RP	Total	Metals	Zinc	7440-66-6	3.75	1.75	87.8		µg/L	Water	NA	5
2016	ALS Environmental - WA	K1609312-002	MOA16TML010	SummerWet	Effluent	Final Effluent	SAMP	08/10/2016	200.8	Total	Metals	Zinc	7440-66-6	0.5	0.2	86.6		µg/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-024	M22W-TMT-EF-D3	SummerWet	Effluent	Final Effluent	SAMP	8/11/2022	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	84.3		ug/L	Water	NA	1
2015	ALS Environmental - WA	K1509400-003	MOA15TML010	SummerWet	Effluent	Final Effluent	SAMP	08/25/2015	200.8	Total	Metals	Zinc	7440-66-6	0.5	0.09	83.6		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1506642-006	MOA15TML002	SummerDry	Effluent	Final Effluent	SAMP	06/16/2015	200.8	Total	Metals	Zinc	7440-66-6	0.5	0.08	82.9		µg/L	Water	NA	1
2015	ALS Environmental - WA	K1509281-007	MOA15TML008	SummerWet	Effluent	Final Effluent	SAMP	08/24/2015	200.8	Total	Metals	Zinc	7440-66-6	0.5	0.08	79.8		µg/L	Water	NA	1
2022	ALS Environmental - WA	K2209249-016	M22W-TMT-EF-D2	SummerWet	Effluent	Final Effluent	SAMP	8/9/2022	200.8	Total	Metals	Zinc	7440-66-6	2	0.5	75.4		ug/L	Water	NA	1
2022	Brooks Applied Labs	2206310-32	M22R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/16/2022	ICP-MS	Total	Metals	Zinc	7440-66-6	22	7	69.5		ug/L	Water	NA	10
2016	Brooks Applied Labs	1626048-22RE1	MOA16TMT008	RecWater	Effluent	Final Effluent	SAMP	06/21/2016	EPA 1640 RP	Total	Metals	Zinc	7440-66-6	0.75	0.35	69.5		µg/L	Water	NA	1
2018	ALS Environmental - WA	K1806181-024	MOA18TML006	SummerDry	Effluent	Final Effluent	SAMP	06/29/2018	200.8	Total	Metals	Zinc	7440-66-6	2	0.2	68.3		µg/L	Water	NA	1
2023	Brooks Applied Labs	2306399-18RE1	M23R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/20/2023	EPA 1640 Column	Total	Metals	Zinc	7440-66-6	0.69	0.23	66.5		ug/L	Water	NA	5
2021	Brooks Applied Labs	2106131-18	M21R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/08/2021	EPA 1640 RP	Total	Metals	Zinc	7440-66-6	1.2	0.6	61.1		ug/L	Water	NA	1
2020	Brooks Applied Labs	2026050-02RE2	M20R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/24/2020	EPA 1640 RP	Total	Metals	Zinc	7440-66-6	1.5	0.7	57.6		ug/L	Water	NA	2
2019	Brooks Applied Labs	1925069-18RE1	M19R-MTT-EF	RecWater	Effluent	Final Effluent	SAMP	06/18/2019	EPA 1640 RP	Total	Metals	Zinc	7440-66-6	3.75	1.3	57.2		ug/L	Water	NA	5
2019	KEI				Effluent	Final Effluent	SAMP	01/01/2019	EPA 350.1	Total	Ammonia	Ammonia	7664-41-7	--	--	22.1		mg/L	Water	--	--
2019	KEI				Effluent	Final Effluent	SAMP	02/05/2019	EPA 350.2	Total	Ammonia	Ammonia	7664-41-8	--	--	27.8		mg/L	Water	--	--
2019	KEI				Effluent	Final Effluent	SAMP	03/13/2019	EPA 350.3	Total	Ammonia	Ammonia	7664-41-9	--	--	27.5		mg/L	Water	--	--
2019	KEI				Effluent	Final Effluent	SAMP	04/03/2019	EPA 350.4	Total	Ammonia	Ammonia	7664-41-10	--	--	24.4		mg/L	Water	--	--
2019	KEI				Effluent	Final Effluent	SAMP	05/07/2019	EPA 350.5	Total	Ammonia	Ammonia	7664-41-11	--	--	23.1		mg/L	Water	--	--
2019	KEI				Effluent	Final Effluent	SAMP	06/26/2019	EPA 350.6	Total	Ammonia	Ammonia	7664-41-12	--	--	25.3		mg/L	Water	--	--
2019	KEI				Effluent	Final Effluent	SAMP	07/03/2019	EPA 350.7	Total	Ammonia	Ammonia	7664-41-13	--	--	26.4		mg/L	Water	--	--
2019	KEI				Effluent	Final Effluent	SAMP	08/06/2019	EPA 350.8	Total	Ammonia	Ammonia	7664-41-14	--	--	26.2		mg/L	Water	--	--
2019	KEI				Effluent	Final Effluent	SAMP	09/03/2019	EPA 350.9	Total	Ammonia	Ammonia	7664-41-15	--	--	26.1		mg/L	Water	--	--
2019	KEI				Effluent	Final Effluent	SAMP	10/01/2019	EPA 350.10	Total	Ammonia	Ammonia	7664-41-16	--	--	25.5		mg/L	Water	--	--
2019	KEI				Effluent	Final Effluent	SAMP	11/07/2019	EPA 350.11	Total	Ammonia	Ammonia	7664-41-17	--	--	28.6		mg/L	Water	--	--
2020	KEI				Effluent	Final Effluent	SAMP	01/01/2020	EPA 350.12	Total	Ammonia	Ammonia	7664-41-18	--	--	21.7		mg/L	Water	--	--

Appendix C, Attachment C-1. Effluent Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Lab Code/Lab No	Sample No.	Study Component	Location	Location Detail	Sample Type	Sample Date	Analysis Method	Fraction - Metals	Analysis	Analyte	CAS Number	Reporting Limit	Detection Limit	Report Result	Qualifier- Final	Units	Matrix	Basis	Dilution Factor
2020	KEI				Effluent	Final Effluent	SAMP	02/04/2020	EPA 350.13	Total	Ammonia	Ammonia	7664-41-19	--	--	26		mg/L	Water	--	--
2020	KEI				Effluent	Final Effluent	SAMP	03/09/2020	EPA 350.14	Total	Ammonia	Ammonia	7664-41-20	--	--	25.9		mg/L	Water	--	--
2020	KEI				Effluent	Final Effluent	SAMP	04/07/2020	EPA 350.15	Total	Ammonia	Ammonia	7664-41-21	--	--	27.2		mg/L	Water	--	--
2020	KEI				Effluent	Final Effluent	SAMP	05/06/2020	EPA 350.16	Total	Ammonia	Ammonia	7664-41-22	--	--	21.9		mg/L	Water	--	--
2020	KEI				Effluent	Final Effluent	SAMP	06/08/2020	EPA 350.17	Total	Ammonia	Ammonia	7664-41-23	--	--	26.1		mg/L	Water	--	--
2020	KEI				Effluent	Final Effluent	SAMP	07/07/2020	EPA 350.18	Total	Ammonia	Ammonia	7664-41-24	--	--	28.9		mg/L	Water	--	--
2020	KEI				Effluent	Final Effluent	SAMP	08/04/2020	EPA 350.19	Total	Ammonia	Ammonia	7664-41-25	--	--	31.4		mg/L	Water	--	--
2020	KEI				Effluent	Final Effluent	SAMP	09/01/2020	EPA 350.20	Total	Ammonia	Ammonia	7664-41-26	--	--	21.7		mg/L	Water	--	--
2020	KEI				Effluent	Final Effluent	SAMP	10/06/2020	EPA 350.21	Total	Ammonia	Ammonia	7664-41-27	--	--	31.4		mg/L	Water	--	--
2020	KEI				Effluent	Final Effluent	SAMP	11/03/2020	EPA 350.22	Total	Ammonia	Ammonia	7664-41-28	--	--	23.7		mg/L	Water	--	--
2020	KEI				Effluent	Final Effluent	SAMP	12/01/2020	EPA 350.23	Total	Ammonia	Ammonia	7664-41-29	--	--	27.1		mg/L	Water	--	--
2021	KEI				Effluent	Final Effluent	SAMP	01/05/2021	EPA 350.24	Total	Ammonia	Ammonia	7664-41-30	--	--	28.5		mg/L	Water	--	--
2021	KEI				Effluent	Final Effluent	SAMP	02/02/2021	EPA 350.25	Total	Ammonia	Ammonia	7664-41-31	--	--	26.4		mg/L	Water	--	--
2021	KEI				Effluent	Final Effluent	SAMP	03/02/2021	EPA 350.26	Total	Ammonia	Ammonia	7664-41-32	--	--	29.8		mg/L	Water	--	--
2021	KEI				Effluent	Final Effluent	SAMP	04/06/2021	EPA 350.27	Total	Ammonia	Ammonia	7664-41-33	--	--	25.2		mg/L	Water	--	--
2021	KEI				Effluent	Final Effluent	SAMP	05/04/2021	EPA 350.28	Total	Ammonia	Ammonia	7664-41-34	--	--	25.6		mg/L	Water	--	--
2021	KEI				Effluent	Final Effluent	SAMP	06/01/2021	EPA 350.29	Total	Ammonia	Ammonia	7664-41-35	--	--	26.7		mg/L	Water	--	--
2021	KEI				Effluent	Final Effluent	SAMP	07/06/2021	EPA 350.30	Total	Ammonia	Ammonia	7664-41-36	--	--	25.1		mg/L	Water	--	--
2021	KEI				Effluent	Final Effluent	SAMP	08/04/2021	EPA 350.31	Total	Ammonia	Ammonia	7664-41-37	--	--	30.1		mg/L	Water	--	--
2021	KEI				Effluent	Final Effluent	SAMP	09/06/2021	EPA 350.32	Total	Ammonia	Ammonia	7664-41-38	--	--	24.5		mg/L	Water	--	--
2021	KEI				Effluent	Final Effluent	SAMP	10/05/2021	EPA 350.33	Total	Ammonia	Ammonia	7664-41-39	--	--	27.6		mg/L	Water	--	--
2021	KEI				Effluent	Final Effluent	SAMP	11/02/2021	EPA 350.34	Total	Ammonia	Ammonia	7664-41-40	--	--	25.2		mg/L	Water	--	--
2021	KEI				Effluent	Final Effluent	SAMP	12/07/2021	EPA 350.35	Total	Ammonia	Ammonia	7664-41-41	--	--	24.8		mg/L	Water	--	--
2022	KEI				Effluent	Final Effluent	SAMP	01/04/2022	EPA 350.36	Total	Ammonia	Ammonia	7664-41-42	--	--	24.2		mg/L	Water	--	--
2022	KEI				Effluent	Final Effluent	SAMP	02/01/2022	EPA 350.37	Total	Ammonia	Ammonia	7664-41-43	--	--	27.6		mg/L	Water	--	--
2022	KEI				Effluent	Final Effluent	SAMP	03/01/2022	EPA 350.38	Total	Ammonia	Ammonia	7664-41-44	--	--	26.2		mg/L	Water	--	--
2022	KEI				Effluent	Final Effluent	SAMP	04/05/2022	EPA 350.39	Total	Ammonia	Ammonia	7664-41-45	--	--	22.2		mg/L	Water	--	--
2022	KEI				Effluent	Final Effluent	SAMP	05/03/2022	EPA 350.40	Total	Ammonia	Ammonia	7664-41-46	--	--	28.1		mg/L	Water	--	--
2022	KEI				Effluent	Final Effluent	SAMP	06/07/2022	EPA 350.41	Total	Ammonia	Ammonia	7664-41-47	--	--	26.8		mg/L	Water	--	--
2022	KEI				Effluent	Final Effluent	SAMP	07/05/2022	EPA 350.42	Total	Ammonia	Ammonia	7664-41-48	--	--	28.2		mg/L	Water	--	--
2022	KEI				Effluent	Final Effluent	SAMP	08/02/2022	EPA 350.43	Total	Ammonia	Ammonia	7664-41-49	--	--	23.6		mg/L	Water	--	--
2022	KEI				Effluent	Final Effluent	SAMP	09/06/2022	EPA 350.44	Total	Ammonia	Ammonia	7664-41-50	--	--	25.1		mg/L	Water	--	--
2022	KEI				Effluent	Final Effluent	SAMP	10/05/2022	EPA 350.45	Total	Ammonia	Ammonia	7664-41-51	--	--	19.8		mg/L	Water	--	--
2022	KEI				Effluent	Final Effluent	SAMP	11/01/2022	EPA 350.46	Total	Ammonia	Ammonia	7664-41-52	--	--	19.9		mg/L	Water	--	--
2022	KEI				Effluent	Final Effluent	SAMP	12/06/2022	EPA 350.47	Total	Ammonia	Ammonia	7664-41-53	--	--	30.4		mg/L	Water	--	--
2023	KEI				Effluent	Final Effluent	SAMP	01/03/2023	EPA 350.48	Total	Ammonia	Ammonia	7664-41-54	--	--	23.3		mg/L	Water	--	--
2023	KEI				Effluent	Final Effluent	SAMP	02/07/2023	EPA 350.49	Total	Ammonia	Ammonia	7664-41-55	--	--	26		mg/L	Water	--	--
2023	KEI				Effluent	Final Effluent	SAMP	03/07/2023	EPA 350.50	Total	Ammonia	Ammonia	7664-41-56	--	--	31		mg/L	Water	--	--
2023	KEI				Effluent	Final Effluent	SAMP	04/03/2023	EPA 350.51	Total	Ammonia	Ammonia	7664-41-57	--	--	27.8		mg/L	Water	--	--
2023	KEI				Effluent	Final Effluent	SAMP	05/02/2023	EPA 350.52	Total	Ammonia	Ammonia	7664-41-58	--	--	19.7		mg/L	Water	--	--
2023	KEI				Effluent	Final Effluent	SAMP	06/13/2023	EPA 350.53	Total	Ammonia	Ammonia	7664-41-59	--	--	33		mg/L	Water	--	--
2023	KEI				Effluent	Final Effluent	SAMP	07/04/2023	EPA 350.54	Total	Ammonia	Ammonia	7664-41-60	--	--	29.2		mg/L	Water	--	--
2023	KEI				Effluent	Final Effluent	SAMP	08/08/2023	EPA 350.55	Total	Ammonia	Ammonia	7664-41-61	--	--	20.3		mg/L	Water	--	--
2023	KEI				Effluent	Final Effluent	SAMP	09/04/2023	EPA 350.56	Total	Ammonia	Ammonia	7664-41-62	--	--	22.3		mg/L	Water	--	--
2023	KEI				Effluent	Final Effluent	SAMP	10/10/2023	EPA 350.57	Total	Ammonia	Ammonia	7664-41-63	--	--	25.5		mg/L	Water	--	--
2023	KEI				Effluent	Final Effluent	SAMP	11/09/2023	EPA 350.58	Total	Ammonia	Ammonia	7664-41-64	--	--	21.7		mg/L	Water	--	--
2023	KEI				Effluent	Final Effluent	SAMP	12/05/2023	EPA 350.59	Total	Ammonia	Ammonia	7664-41-65	--	--	29.7		mg/L	Water	--	--

Attachment C2
Fish Tissue Data

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			79.2					79.2
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.01	0.002	0.007	J		0.01	0.002	0.007
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.1	0.02	0.93			0.1	0.02	0.93
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0041	0.0010	0.0017	J		0.0041	0.001	0.0017
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0041	0.0031	0.0218			0.0041	0.0031	0.0218
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.041	0.021	0.148			0.041	0.021	0.148
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.021	0.018	1.53			0.021	0.018	1.53
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0041	0.0021	0.0218			0.0041	0.0021	0.0218
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.021	0.006	0.007	J		0.021	0.006	0.007
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.041	0.012	0.152			0.041	0.012	0.152
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.21	0.005	0.19	J		0.21	0.005	0.19
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0041	0.0016	0.0054			0.0041	0.0016	0.0054
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0041	0.0005	0.0013	J		0.0041	0.0005	0.0013
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			20.8					20.8
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.1	0.09	14.3			0.1	0.09	14.3
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			81.4					81.4
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.0092	0.0022	0.004	J		0.0092	0.0022	0.004
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.092	0.018	7.12			0.092	0.018	7.12
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0037	0.0009	0.0009	J		0.0037	0.0009	0.0009
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0037	0.0028	0.0341			0.0037	0.0028	0.0341
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.037	0.018	0.301			0.037	0.018	0.301
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.018	0.017	0.947			0.018	0.017	0.947
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0037	0.0018	0.0198			0.0037	0.0018	0.0198
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.018	0.005	0.015	J		0.018	0.005	0.015
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.037	0.011	0.236			0.037	0.011	0.236
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.18	0.02	0.9			0.18	0.02	0.9
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0037	0.0015	0.0351			0.0037	0.0015	0.0351
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0037	0.0004	0.0023	J		0.0037	0.0004	0.0023
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			18.6					18.6
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.092	0.083	14.5			0.092	0.083	14.5
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			71.8					71.8
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.014	0.013	ND	ND		0.014	0.013	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.14	0.03	1.32			0.14	0.03	1.32
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0056	0.0051	ND	ND		0.0056	0.0051	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0056	0.0042	0.0653			0.0056	0.0042	0.0653
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.056	0.028	0.444			0.056	0.028	0.444
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.028	0.025	1.78			0.028	0.025	1.78
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0056	0.0028	0.0105			0.0056	0.0028	0.0105
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.028	0.008	0.025	J		0.028	0.008	0.025
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.056	0.017	0.221			0.056	0.017	0.221
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.28	0.03	0.83			0.28	0.03	0.83
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0056	0.0023	0.0459			0.0056	0.0023	0.0459
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0056	0.0006	0.0037	J		0.0056	0.0006	0.0037
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			28.2					28.2
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.14	0.13	48.3			0.14	0.13	48.3
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			81.1					81.1
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.0093	0.0022	0.0054	J		0.0093	0.0022	0.0054
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.093	0.019	3.67			0.093	0.019	3.67
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0037	0.0033	0.0062			0.0037	0.0033	0.0062
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0037	0.0028	0.747			0.0037	0.0028	0.747
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.037	0.019	0.867			0.037	0.019	0.867
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.019	0.017	19.7			0.019	0.017	19.7
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0037	0.0019	0.0812			0.0037	0.0019	0.0812
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.019	0.017	0.052			0.019	0.017	0.052
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.037	0.011	0.575			0.037	0.011	0.575
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.19	0.02	0.46			0.19	0.02	0.46
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0037	0.0015	0.246			0.0037	0.0015	0.246
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0037	0.0004	0.0036	J		0.0037	0.0004	0.0036
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			18.9					18.9
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.093	0.084	10.8			0.093	0.084	10.8
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			72.4					72.4
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.014	0.012	ND	ND		0.014	0.012	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.14	0.03	1.29			0.14	0.03	1.29
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0054	0.0013	0.0018	J		0.0054	0.0013	0.0018
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0054	0.0041	0.055			0.0054	0.0041	0.055
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.054	0.027	0.884			0.054	0.027	0.884
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.027	0.024	1.78			0.027	0.024	1.78
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0054	0.0027	0.0312			0.0054	0.0027	0.0312
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.027	0.024	0.028			0.027	0.024	0.028
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.054	0.016	0.434			0.054	0.016	0.434
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.27	0.03	0.83			0.27	0.03	0.83
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0054	0.0022	0.0318			0.0054	0.0022	0.0318
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0054	0.0006	0.0037	J		0.0054	0.0006	0.0037
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			27.6					27.6
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.14	0.12	48.3			0.14	0.12	48.3
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			81.8					81.8
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.0091	0.0022	0.004	J		0.0091	0.0022	0.004
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.091	0.018	5.22			0.091	0.018	5.22
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0036	0.0009	0.0023	J		0.0036	0.0009	0.0023
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0036	0.0027	0.0259			0.0036	0.0027	0.0259
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.036	0.018	0.387			0.036	0.018	0.387
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.018	0.016	1.03			0.018	0.016	1.03
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0036	0.0018	0.036			0.0036	0.0018	0.036

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.018	0.005	0.013	J		0.018	0.005	0.013
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.036	0.011	0.274			0.036	0.011	0.274
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.18	0.02	0.64			0.18	0.02	0.64
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0036	0.0015	0.0314			0.0036	0.0015	0.0314
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0036	0.0004	0.0026	J		0.0036	0.0004	0.0026
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			18.2					18.2
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.091	0.082	12.9			0.091	0.082	12.9
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			79.8					79.8
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.0099	0.0089	ND	ND		0.0099	0.0089	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.099	0.02	1.13			0.099	0.02	1.13
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0039	0.0036	ND	ND		0.0039	0.0036	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0039	0.003	0.0309			0.0039	0.003	0.0309
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.039	0.02	0.189			0.039	0.02	0.189
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.02	0.018	1.13			0.02	0.018	1.13
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0039	0.002	0.0083			0.0039	0.002	0.0083
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.020	0.018	ND	ND		0.02	0.018	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.039	0.012	0.097			0.039	0.012	0.097
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.2	0.005	0.19	J		0.2	0.005	0.19
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0039	0.0016	0.005			0.0039	0.0016	0.005
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0039	0.0005	0.0006	J		0.0039	0.0005	0.0006
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			20.2					20.2
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.099	0.089	13.3			0.099	0.089	13.3
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			72.5					72.5
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.014	0.012	ND	ND		0.014	0.012	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.14	0.03	1.27			0.14	0.03	1.27
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0054	0.0049	ND	ND		0.0054	0.0049	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0054	0.0041	0.0678			0.0054	0.0041	0.0678
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.054	0.027	0.193			0.054	0.027	0.193
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.027	0.024	1.69			0.027	0.024	1.69
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0054	0.0027	0.0122			0.0054	0.0027	0.0122
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.027	0.008	0.024	J		0.027	0.008	0.024
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.054	0.016	0.118			0.054	0.016	0.118
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.27	0.03	0.84			0.27	0.03	0.84
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0054	0.0022	0.0518			0.0054	0.0022	0.0518
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0054	0.0006	0.0029	J		0.0054	0.0006	0.0029
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			27.5					27.5
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.14	0.12	48.3			0.14	0.12	48.3
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			81.6					81.6
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.0092	0.0022	0.0048	J		0.0092	0.0022	0.0048
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.092	0.018	9.25			0.092	0.018	9.25
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0037	0.0033	ND	ND		0.0037	0.0033	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0037	0.0028	0.0246			0.0037	0.0028	0.0246
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.037	0.018	0.313			0.037	0.018	0.313
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.018	0.017	0.917			0.018	0.017	0.917
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0037	0.0018	0.0192			0.0037	0.0018	0.0192
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.018	0.005	0.014	J		0.018	0.005	0.014
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.037	0.011	0.223			0.037	0.011	0.223
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.18	0.02	0.84			0.18	0.02	0.84
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0037	0.0015	0.019			0.0037	0.0015	0.019
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0037	0.0004	0.0017	J		0.0037	0.0004	0.0017
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			18.4					18.4
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.092	0.083	15.5			0.092	0.083	15.5
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			81					81
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.0093	0.0084	0.0138			0.0093	0.0084	0.0138
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.093	0.019	5.52			0.093	0.019	5.52
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0037	0.0034	ND	ND		0.0037	0.0034	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0037	0.0028	0.0419			0.0037	0.0028	0.0419
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.037	0.019	0.15			0.037	0.019	0.15
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.019	0.017	0.899			0.019	0.017	0.899
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0037	0.0019	0.014			0.0037	0.0019	0.014
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.019	0.005	0.015	J		0.019	0.005	0.015
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.037	0.011	0.195			0.037	0.011	0.195
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.19	0.02	0.8			0.19	0.02	0.8
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0037	0.0015	0.0289			0.0037	0.0015	0.0289
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0037	0.0004	0.0022	J		0.0037	0.0004	0.0022
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			19					19
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.093	0.084	16.2			0.093	0.084	16.2
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			71.2					71.2
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.014	0.013	ND	ND		0.014	0.013	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.14	0.03	1.37			0.14	0.03	1.37
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0057	0.0051	ND	ND		0.0057	0.0051	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0057	0.0043	0.0654			0.0057	0.0043	0.0654
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.057	0.028	0.235			0.057	0.028	0.235
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.028	0.026	1.74			0.028	0.026	1.74
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0057	0.0028	0.0148			0.0057	0.0028	0.0148
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.028	0.008	0.024	J		0.028	0.008	0.024
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.057	0.017	0.145			0.057	0.017	0.145
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.28	0.03	0.99			0.28	0.03	0.99
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0057	0.0023	0.0431			0.0057	0.0023	0.0431
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0057	0.0007	0.0032	J		0.0057	0.0007	0.0032
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			28.8					28.8
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.14	0.13	50.9			0.14	0.13	50.9
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			68.2					68.2

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.016	0.004	0.014	J		0.016	0.004	0.014
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.16	0.03	1.41			0.16	0.03	1.41
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0063	0.0056	ND	ND		0.0063	0.0056	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0063	0.0047	0.0519			0.0063	0.0047	0.0519
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.063	0.031	0.304			0.063	0.031	0.304
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.031	0.028	2.27			0.031	0.028	2.27
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0063	0.0031	0.0375			0.0063	0.0031	0.0375
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.031	0.009	0.02	J		0.031	0.009	0.02
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.063	0.019	0.226			0.063	0.019	0.226
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.31	0.03	0.84			0.31	0.03	0.84
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0063	0.0025	0.0299			0.0063	0.0025	0.0299
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0063	0.0007	0.0033	J		0.0063	0.0007	0.0033
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			31.8					31.8
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.16	0.14	43.2			0.16	0.14	43.2
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			76					76
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.012	0.011	ND	ND		0.012	0.011	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.12	0.02	1.28			0.12	0.02	1.28
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0048	0.0043	ND	ND		0.0048	0.0043	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0048	0.0036	0.0191			0.0048	0.0036	0.0191
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.048	0.024	0.102			0.048	0.024	0.102
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.024	0.022	0.949			0.024	0.022	0.949
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0048	0.0024	0.0082			0.0048	0.0024	0.0082
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.024	0.022	ND	ND		0.024	0.022	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.048	0.014	0.057			0.048	0.014	0.057
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.24	0.006	0.16	J		0.24	0.006	0.16
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0048	0.0005	0.0026	J		0.0048	0.0005	0.0026
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0048	0.0022	ND	ND		0.0048	0.0022	ND
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			24					24
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.12	0.11	12.4			0.12	0.11	12.4
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			80.9					80.9
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.0095	0.0023	0.0051	J		0.0095	0.0023	0.0051
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.095	0.019	8.91			0.095	0.019	8.91
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0038	0.0009	0.0024	J		0.0038	0.0009	0.0024
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0038	0.0028	0.0483			0.0038	0.0028	0.0483
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.038	0.019	0.399			0.038	0.019	0.399
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.019	0.017	1.26			0.019	0.017	1.26
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0038	0.0019	0.0469			0.0038	0.0019	0.0469
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.019	0.017	0.021			0.019	0.017	0.021
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.038	0.011	0.34			0.038	0.011	0.34
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.19	0.02	0.96			0.19	0.02	0.96
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0038	0.0015	0.0484			0.0038	0.0015	0.0484
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0038	0.0004	0.0027	J		0.0038	0.0004	0.0027
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			19.1					19.1
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.095	0.085	15.2			0.095	0.085	15.2
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			78.2					78.2
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.011	0.010	ND	ND		0.011	0.01	ND
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.11	0.02	1			0.11	0.02	1
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0043	0.0039	ND	ND		0.0043	0.0039	ND
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0043	0.0032	0.0184			0.0043	0.0032	0.0184
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.043	0.006	0.025	J		0.043	0.006	0.025
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.022	0.019	1.01			0.022	0.019	1.01
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0043	0.0006	0.0015	J		0.0043	0.0006	0.0015
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.022	0.019	ND	ND		0.022	0.019	ND
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.043	0.003	0.018	J		0.043	0.003	0.018
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.22	0.006	0.18	J		0.22	0.006	0.18
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0043	0.0005	0.0032	J		0.0043	0.0005	0.0032
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0043	0.0019	ND	ND		0.0043	0.0019	ND
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			21.8					21.8
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.11	0.1	12			0.11	0.1	12
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/19/2024	NONE	Calculation	Tissue	As Received	%	NA	Moisture (%)	Moisture	1			78.6					78.6
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-36-0	Metals	Antimony	5	0.011	0.003	0.003	J		0.011	0.003	0.003
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-38-2	Metals	Arsenic	5	0.11	0.02	1.08			0.11	0.02	1.08
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-41-7	Metals	Beryllium	5	0.0042	0.0038	ND	ND		0.0042	0.0038	ND
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-43-9	Metals	Cadmium	5	0.0042	0.0032	0.0327			0.0042	0.0032	0.0327
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-47-3	Metals	Chromium	5	0.042	0.021	0.057			0.042	0.021	0.057
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-50-8	Metals	Copper	5	0.021	0.019	0.954			0.021	0.019	0.954
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-92-1	Metals	Lead	5	0.0042	0.0006	0.0034	J		0.0042	0.0006	0.0034
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7439-98-7	Metals	Molybdenum	5	0.021	0.019	ND	ND		0.021	0.019	ND
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-02-0	Metals	Nickel	5	0.042	0.003	0.028	J		0.042	0.003	0.028
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7782-49-2	Metals	Selenium	5	0.21	0.005	0.18	J		0.21	0.005	0.18
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-22-4	Metals	Silver	5	0.0042	0.0005	0.0036	J		0.0042	0.0005	0.0036
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-28-0	Metals	Thallium	5	0.0042	0.0019	ND	ND		0.0042	0.0019	ND
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/19/2024	NONE	Freeze Dry	Tissue	Wet weight	%	NA	Solids (%)	Solids, Total	1			21.4					21.4
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/25/2024	PSEP Metals	6020A	Tissue	Wet weight	mg/Kg	7440-66-6	Metals	Zinc	5	0.11	0.1	13.3			0.11	0.1	13.3
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	39	20	200			0.039	0.02	0.2
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	2000	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	2	0.019	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	77		ND	ND		0.077		

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	39	20	98			0.039	0.02	0.098
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	39	7.3	29	J		0.039	0.0073	0.029
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	98	20	ND	ND		0.098	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	1	2000	40	ND	ND		2	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	98	8.2	ND	ND		0.098	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	1	98	8	ND	ND		0.098	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	1	2000	2000	ND	ND		2	2	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	2000	400	ND	ND		2	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	77		ND	ND		0.077		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	2000	8	ND	ND		2	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	2000	9.3	ND	ND		2	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	2000	400	ND	ND		2	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	37	20	ND	ND		0.037	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	1900	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	1.9	0.019	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	37	20	ND	ND		0.037	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	37	20	ND	ND		0.037	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	37	20	ND	ND		0.037	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	93	20	ND	ND		0.093	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	37	20	ND	ND		0.037	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	37	20	ND	ND		0.037	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	10	19000	400	ND	ND		19	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	10	370	80	ND	ND		0.37	0.08	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	93	8.2	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.093	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	10	930	52	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.93	0.052	

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	10	20000	20000	ND	ND		20	20	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	1900	8	ND	ND		1.9	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	1900	9.3	ND	ND		1.9	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	1900	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	1.9	0.019	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	38		ND	ND		0.038		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	96	20	ND	ND		0.096	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	10	19000	120	910	J		19	0.12	0.91
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	10	380	80	ND	ND		0.38	0.08	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	10	380	80	ND	ND		0.38	0.08	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	10	960	82	ND	ND		0.96	0.082	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	10	960	52	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.96	0.052	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	10	20000	20000	ND	ND		20	20	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	1900	8	ND	ND		1.9	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	1900	9.3	ND	ND		1.9	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	10	380	80	ND	ND		0.38	0.08	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	40	20	110			0.04	0.02	0.11
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	2000	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	2	0.019	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	50		ND	ND		0.05		

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	100	20	ND	ND		0.1	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	1	2000	40	ND	ND		2	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	100	8.2	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.1	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	1	100	8	ND	ND		0.1	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	1	2000	2000	ND	ND		2	2	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	2000	400	ND	ND		2	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	2000	8	ND	ND		2	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	2000	9.3	ND	ND		2	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	2000	400	ND	ND		2	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	2000	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	2	0.019	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	98	20	ND	ND		0.098	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/10/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	10	20000	120	850	J		20	0.12	0.85
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	10	390	80	ND	ND		0.39	0.08	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	98	8.2	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.098	0.0082	

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	10	980	52	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.98	0.052	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	10	20000	20000	ND	ND		20	20	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	2000	400	ND	ND		2	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	2000	8	ND	ND		2	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	47		ND	ND		0.047		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	2000	9.3	ND	ND		2	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	2000	400	ND	ND		2	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	1900	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	1.9	0.019	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	97	20	ND	ND		0.097	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	10	19000	400	ND	ND		19	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	97	8.2	ND	ND		0.097	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	10	970	52	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.97	0.052	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	10	20000	20000	ND	ND		20	20	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	1900	8	ND	ND		1.9	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	1900	9.3	ND	ND		1.9	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	38		ND	ND		0.038		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	37	20	45			0.037	0.02	0.045
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	1900	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	1.9	0.019	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	37	20	ND	ND		0.037	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	38		ND	ND		0.038		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	37	20	ND	ND		0.037	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	37	7.3	9.2	J		0.037	0.0073	0.0092
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	93	20	ND	ND		0.093	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	37	20	ND	ND		0.037	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	37	20	ND	ND		0.037	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	38		ND	ND		0.038		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	38		ND	ND		0.038		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	50	250		ND	ND		0.25		

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	1	1900	40	ND	ND		1.9	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	93	8.2	ND	ND		0.093	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	1	93	8	ND	ND		0.093	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	1	2000	2000	ND	ND		2	2	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	1900	8	ND	ND		1.9	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	1900	9.3	ND	ND		1.9	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	37	8	ND	ND		0.037	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	1900	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	1.9	0.019	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/12/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	10	970	200	ND	ND		0.97	0.2	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	10	19000	120	780	J		19	0.12	0.78
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	10	390	80	ND	ND		0.39	0.08	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	97	8.2	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.097	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	10	970	52	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.97	0.052	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	10	20000	20000	ND	ND		20	20	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	1900	8	ND	ND		1.9	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	1900	9.3	ND	ND		1.9	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	39	8	ND	ND		0.039	0.008	

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	39	4.3	7.6	J		0.039	0.0043	0.0076
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	1900	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	1.9	0.019	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	97	20	ND	ND		0.097	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	1	1900	40	ND	ND		1.9	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	97	8.2	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.097	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	1	97	8	190	J+	Requalified to J+ due to elevated concentrations seen in method blank, biased high	0.097	0.008	0.19
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	1	2000	2000	ND	ND		2	2	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	1900	8	ND	ND		1.9	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	1900	9.3	ND	ND		1.9	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	1900	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	1.9	0.019	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	38		ND	ND		0.038		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	94	20	ND	ND		0.094	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	10	49		ND	ND		0.049		

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	1	1900	40	ND	ND		1.9	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	94	8.2	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.094	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	1	94	8	150	J+	Requalified to J+ due to elevated concentrations seen in method blank, biased high	0.094	0.008	0.15
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	1	2000	2000	ND	ND		2	2	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	1900	8	ND	ND		1.9	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	1900	9.3	ND	ND		1.9	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	1900	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	1.9	0.019	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	97	20	ND	ND		0.097	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	10	19000	120	800	J		19	0.12	0.8
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	10	390	80	ND	ND		0.39	0.08	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	97	8.2	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.097	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	10	970	80	ND	ND		0.97	0.08	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	10	20000	20000	ND	ND		20	20	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	49		ND	ND		0.049		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	1900	8	ND	ND		1.9	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	1900	9.3	ND	ND		1.9	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	39	8	ND	ND		0.039	0.008	

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	39	4.3	12	J		0.039	0.0043	0.012
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	2000	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	2	0.019	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	99	20	ND	ND		0.099	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	10	20000	120	840	J		20	0.12	0.84
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	10	400	80	ND	ND		0.4	0.08	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	99	8.2	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.099	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	10	990	80	ND	ND		0.99	0.08	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	10	20000	20000	ND	ND		20	20	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	2000	400	ND	ND		2	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	2000	8	ND	ND		2	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	2000	9.3	ND	ND		2	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	1900	20	ND	ND		1.9	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	97	20	ND	ND		0.097	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	1	1900	40	ND	ND		1.9	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	97	8.2	ND	ND		0.097	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	1	97	8	ND	ND		0.097	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	1	2000	2000	ND	ND		2	2	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	50		ND	ND		0.05		

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	1900	8	ND	ND		1.9	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	1900	9.3	ND	ND		1.9	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	1900	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	1.9	0.019	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	97	20	ND	ND		0.097	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	39	20	ND	ND		0.039	0.02	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	39		ND	ND		0.039		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	97	8.2	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	0.097	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	1	97	8	240	J+	Requalified to J+ due to elevated concentrations seen in method blank, biased high	0.097	0.008	0.24
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	1	2000	2000	ND	ND		2	2	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	1900	8	ND	ND		1.9	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	48		ND	ND		0.048		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	1900	9.3	ND	ND		1.9	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	39	8	ND	ND		0.039	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	38		ND	ND		0.038		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	2000	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	2	0.019	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	38		ND	ND		0.038		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	40		ND	ND		0.04		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	50		ND	ND		0.05		

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	99	20	ND	ND		0.099	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	40	20	ND	ND		0.04	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	38		ND	ND		0.038		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	38		ND	ND		0.038		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	1	2000	40	ND	ND		2	0.04	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	99	8.2	ND	ND		0.099	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	1	99	8	ND	ND		0.099	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	1	2000	2000	ND	ND		2	2	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	2000	400	ND	ND		2	0.4	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	2000	8	ND	ND		2	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	2000	9.3	ND	ND		2	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	40	8	ND	ND		0.04	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	86-50-0	Pesticides	Azinphos-methyl	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	100-02-7	Phenols	4-Nitrophenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	108-95-2	Phenols	Phenol	1	1900	19	ND	UB	Requalified to ND with UB qualifier due to elevated level in method blank	1.9	0.019	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	105-67-9	Phenols	2,4-Dimethylphenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	8065-48-3	Pesticides	Demeton-O,S	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	95-57-8	Phenols	2-Chlorophenol	1	38		ND	ND		0.038		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-75-5	Phenols	2-Nitrophenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	83-32-9	SVOCs/PAHs	Acenaphthene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	88-06-2	Phenols	2,4,6-Trichlorophenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	208-96-8	SVOCs/PAHs	Acenaphthylene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	87-86-5	Phenols	Pentachlorophenol	1	96	20	ND	ND		0.096	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	120-12-7	SVOCs/PAHs	Anthracene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	59-50-7	Phenols	4-Chloro-3-methylphenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	EPA 3541	8270D SIM-PHENOLS	Tissue	Wet weight	ug/Kg	120-83-2	Phenols	2,4-Dichlorophenol	1	38	20	ND	ND		0.038	0.02	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	56-55-3	SVOCs/PAHs	Benz(a)anthracene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	56-38-2	Pesticides	Ethyl parathion	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	50-32-8	SVOCs/PAHs	Benzo(a)pyrene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	205-99-2	SVOCs/PAHs	Benzo(b)fluoranthene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	EPA 3541	ALS SOP	Tissue	Wet weight	ug/Kg	121-75-5	Pesticides	Malathion	1	37		ND	ND		0.037		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	191-24-2	SVOCs/PAHs	Benzo(g,h,i)perylene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	207-08-9	SVOCs/PAHs	Benzo(k)fluoranthene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-81-7	SVOCs (other)	Bis(2-ethylhexyl) Phthalate	1	1900	40	ND	ND		1.9	0.04	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-91-1	SVOCs (other)	Bis(2-chloroethoxy)methane	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	101-55-3	SVOCs (other)	4-Bromophenyl Phenyl Ether	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	85-68-7	SVOCs (other)	Butyl Benzyl Phthalate	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	218-01-9	SVOCs/PAHs	Chrysene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	53-70-3	SVOCs/PAHs	Dibenz(a,h)anthracene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-58-7	SVOCs (other)	2-Chloronaphthalene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	206-44-0	SVOCs/PAHs	Fluoranthene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	7005-72-3	SVOCs (other)	4-Chlorophenyl Phenyl Ether	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	86-73-7	SVOCs/PAHs	Fluorene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-74-2	SVOCs (other)	Di-n-butyl Phthalate	1	96	8.2	ND	ND		0.096	0.0082	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	117-84-0	SVOCs (other)	Di-n-octyl Phthalate	1	96	8	ND	ND		0.096	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/8/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	193-39-5	SVOCs/PAHs	Indeno(1,2,3-cd)pyrene	50	250		ND	ND		0.25		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	91-20-3	SVOCs/PAHs	Naphthalene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	91-94-1	SVOCs (other)	3,3'-Dichlorobenzidine	1	2000	2000	ND	ND		2	2	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	84-66-2	SVOCs (other)	Diethyl Phthalate	1	400	400	ND	ND		0.4	0.4	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	85-01-8	SVOCs/PAHs	Phenanthrene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	131-11-3	SVOCs (other)	Dimethyl Phthalate	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	51-28-5	SVOCs (other)	2,4-Dinitrophenol	1	1900	400	ND	ND		1.9	0.4	

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3541	8270D	Tissue	Wet weight	ug/Kg	129-00-0	SVOCs/PAHs	Pyrene	10	50		ND	ND		0.05		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	121-14-2	SVOCs (other)	2,4-Dinitrotoluene	1	1900	8	ND	ND		1.9	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	606-20-2	SVOCs (other)	2,6-Dinitrotoluene	1	1900	9.3	ND	ND		1.9	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	118-74-1	SVOCs (other)	Hexachlorobenzene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	87-68-3	SVOCs (other)	Hexachlorobutadiene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	67-72-1	SVOCs (other)	Hexachloroethane	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	78-59-1	SVOCs (other)	Isophorone	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	534-52-1	SVOCs (other)	4,6-Dinitro-2-methylphenol	1	1900	400	ND	ND		1.9	0.4	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	98-95-3	SVOCs (other)	Nitrobenzene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	621-64-7	SVOCs (other)	N-Nitrosodi-n-propylamine	1	40	40	ND	ND		0.04	0.04	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	120-82-1	SVOCs (other)	1,2,4-Trichlorobenzene	1	38	8	ND	ND		0.038	0.008	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	4.4	4.4	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0044	0.0044	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	2.9	2.9	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0029	0.0029	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	7.7			0.001	0.001	0.0077
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	23	23	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.023	0.023	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	2		4.6	P	The GC confirmation criteria was exceeded. The RPD is >40% between the two analytical results	0.002		0.0046
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	3.5	3.5	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0035	0.0035	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	9.6			0.001	0.001	0.0096
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	5.2	5.2	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0052	0.0052	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	27	27	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.027	0.027	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	4.3		ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0043		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	9.5	9.5	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0095	0.0095	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	6.4	6.4	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0064	0.0064	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	4.9	4.9	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0049	0.0049	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	2.8		ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0028		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	8.8			0.001	0.001	0.0088
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	33	33	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.033	0.033	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	2		3.7			0.002		0.0037
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	2.8		ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0028		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	2			0.001	0.001	0.002
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	3.2	3.2	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0032	0.0032	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	9.2			0.001	0.001	0.0092
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	28	28	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.028	0.028	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	2		4.1			0.002		0.0041
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	2		2.9			0.002		0.0029
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	15	P	The GC confirmation criteria was exceeded. The RPD is >40% between the two analytical results	0.001	0.001	0.015
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/9/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	2		4.9			0.002		0.0049
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	2		4.1			0.002		0.0041
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	2.8	2.8	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0028	0.0028	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	8.4	8.4	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0084	0.0084	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	9.3	9.3	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0093	0.0093	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	2		ND	ND		0.002		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	2		3.4	P	The GC confirmation criteria was exceeded. The RPD is >40% between the two analytical results	0.002		0.0034
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	2		5.8	P	The GC confirmation criteria was exceeded. The RPD is >40% between the two analytical results	0.002		0.0058
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	3.2	3.2	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0032	0.0032	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	4.6	4.6	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0046	0.0046	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	1.9		ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	309-00-2	Pesticides	Aldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	58-89-9	Pesticides	gamma-BHC (Lindane)	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	57-74-9	Pesticides	Chlordane	1	10	10	ND	ND		0.01	0.01	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-71-9	Pesticides	alpha-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	5103-74-2	Pesticides	trans-Chlordane	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-54-8	Pesticides	4,4'-DDD	1	6.7	6.7	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0067	0.0067	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-55-9	Pesticides	4,4'-DDE	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	50-29-3	Pesticides	4,4'-DDT	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	60-57-1	Pesticides	Dieldrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	959-98-8	Pesticides	Endosulfan I	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	33213-65-9	Pesticides	Endosulfan II	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1031-07-8	Pesticides	Endosulfan Sulfate	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-20-8	Pesticides	Endrin	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	7421-93-4	Pesticides	Endrin Aldehyde	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	53494-70-5	Pesticides	Endrin Ketone	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	76-44-8	Pesticides	Heptachlor	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	1024-57-3	Pesticides	Heptachlor Epoxide	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	72-43-5	Pesticides	Methoxychlor	1	9.1	9.1	ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0091	0.0091	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	2385-85-5	Pesticides	Mirex	1	1	1	ND	ND		0.001	0.001	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	EPA 3546	8081B	Tissue	Wet weight	ug/Kg	8001-35-2	Pesticides	Toxaphene	1	100	100	ND	ND		0.1	0.1	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12674-11-2	PCBs	Aroclor 1016	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11104-28-2	PCBs	Aroclor 1221	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11141-16-5	PCBs	Aroclor 1232	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	53469-21-9	PCBs	Aroclor 1242	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	12672-29-6	PCBs	Aroclor 1248	1	1.9		ND	ND		0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11097-69-1	PCBs	Aroclor 1254	1	1.9		ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0019		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	6/27/2024	EPA 3546	8082A	Tissue	Wet weight	ug/Kg	11096-82-5	PCBs	Aroclor 1260	1	2.7		ND	ND,i	MRL/MDL elevated due to chromoatographic interference	0.0027		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	2	0.4		3.28			0.0004		0.00328
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	10	1.9		24.9			0.0019		0.0249
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	10	2.8		38.3			0.0028		0.0383
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	10	1.9		25.6			0.0019		0.0256
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	10	2.7		42.2			0.0027		0.0422
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	10	1.8		14.3			0.0018		0.0143
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	2	0.4		3.89			0.0004		0.00389
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	10	2.7		46.5			0.0027		0.0465
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	10	1.8		37.5			0.0018		0.0375
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	10	1.9		26.5			0.0019		0.0265
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	10	2.8		44.9			0.0028		0.0449
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	10	3.1		38.2			0.0031		0.0382
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	2	0.5		3.52			0.0005		0.00352
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	10	1.9		34.4			0.0019		0.0344
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	2	0.4		2.8			0.0004		0.0028

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/3/2024	METHOD	1631E	Tissue	Wet weight	ug/Kg	7439-97-6	Metals	Mercury	2	0.4		3.37			0.0004		0.00337
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	2.1		2.2			0.0021		0.0022
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	1.8		21.2			0.0018		0.0212
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	2.7		38.9			0.0027		0.0389
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	1.9		13.9			0.0019		0.0139
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	2.7		43.7			0.0027		0.0437
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	1.8		16.7			0.0018		0.0167
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	2		2.7			0.002		0.0027
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	2.7		41.7			0.0027		0.0417
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	1.8		24.3			0.0018		0.0243
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	1.9		21.5			0.0019		0.0215
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	2.9		37.8			0.0029		0.0378
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/21/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	3.2		39			0.0032		0.039
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	2.4		4.7			0.0024		0.0047
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	1.9		22.7			0.0019		0.0227
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	2.1		1.9			0.0021		0.0019
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/1/2024	METHOD	ALS SOP	Tissue	Wet weight	ug/Kg	22967-92-6	Metals	Methyl Mercury	1	2.1		3.5			0.0021		0.0035
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/22/2024	7/10/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	0.97		ND	ND		9.7E-07		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/20/2024	7/10/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	0.98		ND	ND		9.8E-07		
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/20/2024	7/11/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	1		ND	ND		0.000001		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/21/2024	7/11/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	0.99		ND	ND		9.9E-07		
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/21/2024	7/11/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	0.97		ND	ND		9.7E-07		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/16/2024	7/11/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	1		ND	ND		0.000001		
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	2	5/16/2024	7/11/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	0.99		ND	ND		9.9E-07		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/22/2024	7/10/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	0.99		ND	ND		9.9E-07		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/22/2024	7/10/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	0.96		ND	ND		9.6E-07		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole Fish	1	6/7/2024	7/10/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	0.98		ND	ND		9.8E-07		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	6/7/2024	7/10/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	0.99		ND	ND		9.9E-07		
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole Fish	1	6/7/2024	7/10/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	0.97		ND	ND		9.7E-07		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole Fish	1	5/23/2024	7/10/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	1		ND	ND		0.000001		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole Fish	1	5/23/2024	7/10/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	0.96		ND	ND		9.6E-07		
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole Fish	1	5/23/2024	7/10/2024	METHOD	USEPA 1613B	Tissue	Wet weight	ng/Kg	1746-01-6	Dioxin	2,3,7,8-Tetrachlorodibenzo-p-di	1	0.99		ND	ND		9.9E-07		
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	39	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	39	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	980	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	980	8.1	320	J			0.0081	0.32
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	39	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP1	IT-2	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	37	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	37	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	930	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	930	8.1	50	J			0.0081	0.05
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	37	3.8	4.1	J			0.0038	0.0041
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP2	IT-2	Pacific Cod	Gadus macrocephalus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	38	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	38	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	960	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	960	8.1	19	J			0.0081	0.019
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	38	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-IT-2-SP3	IT-2	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/22/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	40	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	40	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	1000	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	1000	8.1	81	J			0.0081	0.081
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	40	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP1	IT-C	Spot Shrimp	Pandalus platyceros	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	39	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	39	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	980	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	980	8.1	17	J			0.0081	0.017
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	39	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP2	IT-C	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	39	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	39	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	970	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	970	8.1	36	J			0.0081	0.036
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	39	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-IT-C-SP3	IT-C	Pacific Cod	Gadus macrocephalus	Whole	1	6/7/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	37	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	37	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	930	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	930	8.1	ND	ND			0.0081	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	37	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP1	IT-8	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	39	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	39	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	970	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	970	8.1	19	J			0.0081	0.019
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	39	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP2	IT-8	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	39	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	39	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	970	100	ND	ND			0.1	

Appendix C, Attachment C-2. Fish Tissue Data

AWWU Ecological Risk Evaluation

Year	Laboratory	Service Req	Sample ID	Station	Common Name	Species	Fraction	Rep	Date Collected	Date Analyzed	Extraction Method	Method	Matrix	Basis	Units	CAS No	Component	Analyte	Dilution Factor	MRL	MDL	Final Result	Final Note	Comment	MRL RA	MDL RA	RESULT RA
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	970	8.1	37	J			0.0081	0.037
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	39	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-IT-8-SP3	IT-8	Pacific Cod	Gadus macrocephalus	Whole	1	5/23/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	38	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	38	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	940	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	940	8.1	53	J			0.0081	0.053
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	38	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP1	IT-9	Pacific Cod	Gadus macrocephalus	Whole	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	39	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	39	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	970	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	970	8.1	18	J			0.0081	0.018
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	39	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-IT-9-SP2	IT-9	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/20/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	40	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	40	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	990	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	990	8.1	19	J			0.0081	0.019
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	40	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP1	IT-C4	3-Spined Stickleback	Gasterosteus aculeatus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	39	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	39	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	970	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	970	8.1	85	J			0.0081	0.085
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	39	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP2	IT-C4	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	39	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	39	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	970	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	970	8.1	ND	ND			0.0081	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	39	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-IT-C4-SP3	IT-C4	Pacific Cod	Gadus macrocephalus	Whole	1	5/21/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	40	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	40	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	990	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	990	8.1	100	J			0.0081	0.1
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	40	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP1	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole	1	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	111-44-4	SVOCs (other)	Bis(2-chloroethyl) Ether	1	38	4.5	ND	ND			0.0045	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	122-66-7	SVOCs (other)	1,2-Diphenylhydrazine	1	38	5.3	ND	ND			0.0053	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	77-47-4	SVOCs (other)	Hexachlorocyclopentadiene	1	960	100	ND	ND			0.1	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	62-75-9	SVOCs (other)	N-Nitrosodimethylamine	1	960	8.1	140	J			0.0081	0.14
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	86-30-6	SVOCs (other)	N-Nitrosodiphenylamine	1	38	3.8	ND	ND			0.0038	
2024	ALS Environmental	K2406108	A24-TIS-TMR-SP2	TMR	Eulachon (hooligan)	Thaleichthys pacificus	Whole	2	5/16/2024	7/1/2024	EPA 3541	8270D SIM	Tissue	Wet weight	ug/Kg	108-60-1	SVOCs (other)	Bis(1-chloroisopropyl) Ether	1	40	15	ND	ND			0.015	

Attachment C3
ProUCL 5.2 Output

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 11/22/2024 2:20:03 AM
From File	2015-2023PP Input.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,1,1-Trichloroethane (TCA)

General Statistics

Total Number of Observations	18	Number of Distinct Observations	7
		Number of Missing Observations	409
Number of Detects	1	Number of Non-Detects	17
Number of Distinct Detects	1	Number of Distinct Non-Detects	6

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 1,1,1-Trichloroethane (TCA) was not processed!

1,2-Dichloroethane (EDC)

General Statistics

Total Number of Observations	18	Number of Distinct Observations	6
		Number of Missing Observations	409
Number of Detects	1	Number of Non-Detects	17
Number of Distinct Detects	1	Number of Distinct Non-Detects	5

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 1,2-Dichloroethane (EDC) was not processed!

1,2-Diphenylhydrazine

General Statistics

Total Number of Observations	15	Number of Distinct Observations	10
		Number of Missing Observations	392
Number of Detects	2	Number of Non-Detects	13
Number of Distinct Detects	2	Number of Distinct Non-Detects	8
Minimum Detect	1.1	Minimum Non-Detect	0.11
Maximum Detect	2.5	Maximum Non-Detect	6.19
Variance Detects	0.98	Percent Non-Detects	86.67%
Mean Detects	1.8	SD Detects	0.99
Median Detects	1.8	CV Detects	0.55
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.506	SD of Logged Detects	0.581

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only
Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.396	KM Standard Error of Mean	0.268
90KM SD	0.663	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.867	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.836	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.199	95% KM Chebyshev UCL	1.563
97.5% KM Chebyshev UCL	2.069	99% KM Chebyshev UCL	3.061

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	6.261	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.288	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	25.04	nu star (bias corrected)	N/A
Mean (detects)	1.8		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.396	SD (KM)	0.663
Variance (KM)	0.44	SE of Mean (KM)	0.268
k hat (KM)	0.356	k star (KM)	0.329
nu hat (KM)	10.67	nu star (KM)	9.867
theta hat (KM)	1.113	theta star (KM)	1.203
80% gamma percentile (KM)	0.619	90% gamma percentile (KM)	1.153
95% gamma percentile (KM)	1.756	99% gamma percentile (KM)	3.307

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0324
Approximate Chi Square Value (9.87, α)	3.859	Adjusted Chi Square Value (9.87, β)	3.409
95% KM Approximate Gamma UCL	1.012	95% KM Adjusted Gamma UCL	1.145

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.453	Mean in Log Scale	-1.225
SD in Original Scale	0.615	SD in Log Scale	0.83
95% t UCL (assumes normality of ROS data)	0.733	95% Percentile Bootstrap UCL	0.748
95% BCA Bootstrap UCL	0.925	95% Bootstrap t UCL	1.756
95% H-UCL (Log ROS)	0.72		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.717	KM Geo Mean	0.18
KM SD (logged)	1.035	95% Critical H Value (KM-Log)	2.8
KM Standard Error of Mean (logged)	0.449	95% H-UCL (KM -Log)	0.666
KM SD (logged)	1.035	95% Critical H Value (KM-Log)	2.8
KM Standard Error of Mean (logged)	0.449		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.829	Mean in Log Scale	-0.79
SD in Original Scale	0.891	SD in Log Scale	1.238
95% t UCL (Assumes normality)	1.235	95% H-Stat UCL	2.759

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.867

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1,4-Dichlorobenzene

General Statistics

Total Number of Observations	19	Number of Distinct Observations	14
		Number of Missing Observations	408
Number of Detects	14	Number of Non-Detects	5
Number of Distinct Detects	11	Number of Distinct Non-Detects	3
Minimum Detect	0.27	Minimum Non-Detect	0.16
Maximum Detect	0.84	Maximum Non-Detect	4.7
Variance Detects	0.0406	Percent Non-Detects	26.32%
Mean Detects	0.554	SD Detects	0.202
Median Detects	0.53	CV Detects	0.364
Skewness Detects	0.147	Kurtosis Detects	-1.715
Mean of Logged Detects	-0.657	SD of Logged Detects	0.382

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.882	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.825	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.246	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.263	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.519	KM Standard Error of Mean	0.055
90KM SD	0.208	95% KM (BCA) UCL	0.611
95% KM (t) UCL	0.615	95% KM (Percentile Bootstrap) UCL	0.61
95% KM (z) UCL	0.61	95% KM Bootstrap t UCL	0.616
90% KM Chebyshev UCL	0.684	95% KM Chebyshev UCL	0.759
97.5% KM Chebyshev UCL	0.863	99% KM Chebyshev UCL	1.066

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.766	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.736	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.231	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.229	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	7.793	k star (bias corrected MLE)	6.17
Theta hat (MLE)	0.071	Theta star (bias corrected MLE)	0.0897
nu hat (MLE)	218.2	nu star (bias corrected)	172.8
Mean (detects)	0.554		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.204	Mean	0.52
Maximum	0.84	Median	0.472
SD	0.194	CV	0.373
k hat (MLE)	7.204	k star (bias corrected MLE)	6.102
Theta hat (MLE)	0.0722	Theta star (bias corrected MLE)	0.0852
nu hat (MLE)	273.8	nu star (bias corrected)	231.9

Adjusted Level of Significance (β)	0.0369		
Approximate Chi Square Value (231.87, α)	197.6	Adjusted Chi Square Value (231.87, β)	194.9
95% Gamma Approximate UCL	0.61	95% Gamma Adjusted UCL	0.619

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.519	SD (KM)	0.208
Variance (KM)	0.0434	SE of Mean (KM)	0.055
k hat (KM)	6.208	k star (KM)	5.263
nu hat (KM)	235.9	nu star (KM)	200
theta hat (KM)	0.0836	theta star (KM)	0.0987
80% gamma percentile (KM)	0.694	90% gamma percentile (KM)	0.822
95% gamma percentile (KM)	0.939	99% gamma percentile (KM)	1.185

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (200.00, α)	168.3	Adjusted Chi Square Value (200.00, β)	165.7
95% KM Approximate Gamma UCL	0.617	95% KM Adjusted Gamma UCL	0.627

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.893	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.895	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.209	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.208	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.518	Mean in Log Scale	-0.728
SD in Original Scale	0.193	SD in Log Scale	0.388
95% t UCL (assumes normality of ROS data)	0.594	95% Percentile Bootstrap UCL	0.592
95% BCA Bootstrap UCL	0.595	95% Bootstrap t UCL	0.601
95% H-UCL (Log ROS)	0.62		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.75	KM Geo Mean	0.473
KM SD (logged)	0.458	95% Critical H Value (KM-Log)	1.97
KM Standard Error of Mean (logged)	0.122	95% H-UCL (KM -Log)	0.649
KM SD (logged)	0.458	95% Critical H Value (KM-Log)	1.97
KM Standard Error of Mean (logged)	0.122		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.599	Mean in Log Scale	-0.717
SD in Original Scale	0.472	SD in Log Scale	0.658
95% t UCL (Assumes normality)	0.787	95% H-Stat UCL	0.85

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.615

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1,6,7-Trimethylnaphthalene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9

		Number of Missing Observations	393
Minimum	0.00797	Mean	0.0291
Maximum	0.1	Median	0.0191
SD	0.0295	Std. Error of Mean	0.00984
Coefficient of Variation	1.014	Skewness	2.15

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.692	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.392	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0474	95% Adjusted-CLT UCL (Chen-1995)	0.0528
		95% Modified-t UCL (Johnson-1978)	0.0486

Gamma GOF Test

A-D Test Statistic	0.744	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.733	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.342	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.283	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.689	k star (bias corrected MLE)	1.2
Theta hat (MLE)	0.0172	Theta star (bias corrected MLE)	0.0243
nu hat (MLE)	30.4	nu star (bias corrected)	21.6
MLE Mean (bias corrected)	0.0291	MLE Sd (bias corrected)	0.0266
		Approximate Chi Square Value (0.05)	12.04
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	10.56

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0522	95% Adjusted Gamma UCL	0.0595

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.9	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.289	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data Not Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level
Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-4.832	Mean of logged Data	-3.861
Maximum of Logged Data	-2.303	SD of logged Data	0.793

Assuming Lognormal Distribution

95% H-UCL	0.0632	90% Chebyshev (MVUE) UCL	0.0502
95% Chebyshev (MVUE) UCL	0.0604	97.5% Chebyshev (MVUE) UCL	0.0746
99% Chebyshev (MVUE) UCL	0.102		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0453	95% BCA Bootstrap UCL	0.0532
95% Standard Bootstrap UCL	0.0441	95% Bootstrap-t UCL	0.111
95% Hall's Bootstrap UCL	0.159	95% Percentile Bootstrap UCL	0.0449
90% Chebyshev(Mean, Sd) UCL	0.0586	95% Chebyshev(Mean, Sd) UCL	0.072
97.5% Chebyshev(Mean, Sd) UCL	0.0906	99% Chebyshev(Mean, Sd) UCL	0.127

Suggested UCL to Use

Recommendation cannot be provided

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1-Methyldibenzothiophene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.00264	Minimum Non-Detect	9.6569E-4
Maximum Detect	0.05	Maximum Non-Detect	9.6569E-4
Variance Detects	2.1433E-4	Percent Non-Detects	11.11%
Mean Detects	0.0165	SD Detects	0.0146
Median Detects	0.0147	CV Detects	0.888
Skewness Detects	1.981	Kurtosis Detects	5.01
Mean of Logged Detects	-4.449	SD of Logged Detects	0.948

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.729	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.749	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.379	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.333	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0148	KM Standard Error of Mean	0.00492
90KM SD	0.0138	95% KM (BCA) UCL	0.0227
95% KM (t) UCL	0.0239	95% KM (Percentile Bootstrap) UCL	0.0226
95% KM (z) UCL	0.0229	95% KM Bootstrap t UCL	0.0291
90% KM Chebyshev UCL	0.0295	95% KM Chebyshev UCL	0.0362
97.5% KM Chebyshev UCL	0.0455	99% KM Chebyshev UCL	0.0637

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.726	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.728	Detected data appear Gamma Distributed at 5% Significance Level

K-S Test Statistic	0.291	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.299	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	1.601	k star (bias corrected MLE)	1.084
Theta hat (MLE)	0.0103	Theta star (bias corrected MLE)	0.0152
nu hat (MLE)	25.61	nu star (bias corrected)	17.34
Mean (detects)	0.0165		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00264	Mean	0.0158
Maximum	0.05	Median	0.0144
SD	0.0139	CV	0.879
k hat (MLE)	1.728	k star (bias corrected MLE)	1.226
Theta hat (MLE)	0.00913	Theta star (bias corrected MLE)	0.0129
nu hat (MLE)	31.1	nu star (bias corrected)	22.07
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (22.07, α)	12.39	Adjusted Chi Square Value (22.07, β)	10.89
95% Gamma Approximate UCL	0.0281	95% Gamma Adjusted UCL	0.032

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0148	SD (KM)	0.0138
Variance (KM)	1.9051E-4	SE of Mean (KM)	0.00492
k hat (KM)	1.145	k star (KM)	0.837
nu hat (KM)	20.61	nu star (KM)	15.07
theta hat (KM)	0.0129	theta star (KM)	0.0176
80% gamma percentile (KM)	0.0241	90% gamma percentile (KM)	0.0355
95% gamma percentile (KM)	0.0471	99% gamma percentile (KM)	0.0745

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (15.07, α)	7.311	Adjusted Chi Square Value (15.07, β)	6.207
95% KM Approximate Gamma UCL	0.0304	95% KM Adjusted Gamma UCL	0.0359

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.845	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.851	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.337	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.265	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0148	Mean in Log Scale	-4.687
SD in Original Scale	0.0146	SD in Log Scale	1.139
95% t UCL (assumes normality of ROS data)	0.0239	95% Percentile Bootstrap UCL	0.0229
95% BCA Bootstrap UCL	0.0254	95% Bootstrap t UCL	0.0292
95% H-UCL (Log ROS)	0.0738		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.726	KM Geo Mean	0.00886
KM SD (logged)	1.146	95% Critical H Value (KM-Log)	3.572
KM Standard Error of Mean (logged)	0.408	95% H-UCL (KM -Log)	0.0727
KM SD (logged)	1.146	95% Critical H Value (KM-Log)	3.572
KM Standard Error of Mean (logged)	0.408		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0147	Mean in Log Scale	-4.803
SD in Original Scale	0.0147	SD in Log Scale	1.384
95% t UCL (Assumes normality)	0.0238	95% H-Stat UCL	0.163

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL	0.0359	95% GROS Adjusted Gamma UCL	0.032

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1-Methylfluorene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0129	Mean	0.0231
Maximum	0.05	Median	0.0214
SD	0.0113	Std. Error of Mean	0.00377
Coefficient of Variation	0.489	Skewness	1.964

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.788	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.298	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.0301	95% Adjusted-CLT UCL (Chen-1995)	0.032
		95% Modified-t UCL (Johnson-1978)	0.0306

Gamma GOF Test

A-D Test Statistic	0.495	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.25	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	6.21	k star (bias corrected MLE)	4.214
Theta hat (MLE)	0.00372	Theta star (bias corrected MLE)	0.00549
nu hat (MLE)	111.8	nu star (bias corrected)	75.86

MLE Mean (bias corrected)	0.0231	MLE Sd (bias corrected)	0.0113
		Approximate Chi Square Value (0.05)	56.8
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	53.33

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0309	95% Adjusted Gamma UCL	0.0329

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.222	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-4.348	Mean of logged Data	-3.849
Maximum of Logged Data	-2.996	SD of logged Data	0.408

Assuming Lognormal Distribution

95% H-UCL	0.0315	90% Chebyshev (MVUE) UCL	0.0324
95% Chebyshev (MVUE) UCL	0.0366	97.5% Chebyshev (MVUE) UCL	0.0426
99% Chebyshev (MVUE) UCL	0.0542		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0293	95% BCA Bootstrap UCL	0.032
95% Standard Bootstrap UCL	0.0289	95% Bootstrap-t UCL	0.0378
95% Hall's Bootstrap UCL	0.0608	95% Percentile Bootstrap UCL	0.0295
90% Chebyshev(Mean, Sd) UCL	0.0344	95% Chebyshev(Mean, Sd) UCL	0.0396
97.5% Chebyshev(Mean, Sd) UCL	0.0467	99% Chebyshev(Mean, Sd) UCL	0.0607

Suggested UCL to Use

95% Student's-t UCL	0.0301

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1-Methylnaphthalene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0444	Mean	0.103
Maximum	0.427	Median	0.0589
SD	0.123	Std. Error of Mean	0.041
Coefficient of Variation	1.19	Skewness	2.868

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.515	**Shapiro Wilk GOF Test**	

1% Shapiro Wilk Critical Value	0.764	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.38	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.316	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.179	95% Adjusted-CLT UCL (Chen-1995)	0.212
		95% Modified-t UCL (Johnson-1978)	0.186

Gamma GOF Test

A-D Test Statistic	1.524	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.732	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.353	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.283	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.719	k star (bias corrected MLE)	1.22
Theta hat (MLE)	0.0601	Theta star (bias corrected MLE)	0.0846
nu hat (MLE)	30.93	nu star (bias corrected)	21.96
MLE Mean (bias corrected)	0.103	MLE Sd (bias corrected)	0.0934
		Approximate Chi Square Value (0.05)	12.3
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	10.81

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.184	95% Adjusted Gamma UCL	0.21

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.705	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.306	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.252	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.114	Mean of logged Data	-2.589
Maximum of Logged Data	-0.851	SD of logged Data	0.703

Assuming Lognormal Distribution

95% H-UCL	0.184	90% Chebyshev (MVUE) UCL	0.16
95% Chebyshev (MVUE) UCL	0.19	97.5% Chebyshev (MVUE) UCL	0.233
99% Chebyshev (MVUE) UCL	0.315		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.171	95% BCA Bootstrap UCL	0.226
95% Standard Bootstrap UCL	0.167	95% Bootstrap-t UCL	0.753
95% Hall's Bootstrap UCL	0.493	95% Percentile Bootstrap UCL	0.18
90% Chebyshev(Mean, Sd) UCL	0.226	95% Chebyshev(Mean, Sd) UCL	0.282
97.5% Chebyshev(Mean, Sd) UCL	0.359	99% Chebyshev(Mean, Sd) UCL	0.511

Suggested UCL to Use

Recommendation cannot be provided

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.

Please verify the data were collected from random locations.

If the data were collected using judgmental or other non-random methods,

then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1-Methylphenanthrene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.015	Mean	0.0208
Maximum	0.0285	Median	0.021
SD	0.00377	Std. Error of Mean	0.00126
Coefficient of Variation	0.181	Skewness	0.577

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.897	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.0231	95% Adjusted-CLT UCL (Chen-1995)	0.0231
		95% Modified-t UCL (Johnson-1978)	0.0232

Gamma GOF Test

A-D Test Statistic	0.543	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.258	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	34.62	k star (bias corrected MLE)	23.16
Theta hat (MLE)	6.0068E-4	Theta star (bias corrected MLE)	8.9813E-4
nu hat (MLE)	623.2	nu star (bias corrected)	416.8
MLE Mean (bias corrected)	0.0208	MLE Sd (bias corrected)	0.00432
		Approximate Chi Square Value (0.05)	370.5
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	361.2

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0234	95% Adjusted Gamma UCL	0.024

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.91	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.27	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data Not Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-4.2	Mean of logged Data	-3.887
Maximum of Logged Data	-3.558	SD of logged Data	0.181

Assuming Lognormal Distribution

95% H-UCL	0.0235	90% Chebyshev (MVUE) UCL	0.0246
95% Chebyshev (MVUE) UCL	0.0263	97.5% Chebyshev (MVUE) UCL	0.0287
99% Chebyshev (MVUE) UCL	0.0333		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0229	95% BCA Bootstrap UCL	0.0229
95% Standard Bootstrap UCL	0.0227	95% Bootstrap-t UCL	0.0233
95% Hall's Bootstrap UCL	0.0241	95% Percentile Bootstrap UCL	0.0228
90% Chebyshev(Mean, Sd) UCL	0.0246	95% Chebyshev(Mean, Sd) UCL	0.0263
97.5% Chebyshev(Mean, Sd) UCL	0.0287	99% Chebyshev(Mean, Sd) UCL	0.0333

Suggested UCL to Use

95% Student's-t UCL	0.0231

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2,4,6-Trichlorophenol

General Statistics

Total Number of Observations	15	Number of Distinct Observations	11
		Number of Missing Observations	392
Number of Detects	6	Number of Non-Detects	9
Number of Distinct Detects	5	Number of Distinct Non-Detects	6
Minimum Detect	0.59	Minimum Non-Detect	0.38
Maximum Detect	1.2	Maximum Non-Detect	7.5
Variance Detects	0.0702	Percent Non-Detects	60%
Mean Detects	0.91	SD Detects	0.265
Median Detects	0.98	CV Detects	0.291
Skewness Detects	-0.351	Kurtosis Detects	-2.239
Mean of Logged Detects	-0.133	SD of Logged Detects	0.313

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.864	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.713	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.263	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.373	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.806	KM Standard Error of Mean	0.115
90KM SD	0.288	95% KM (BCA) UCL	0.977
95% KM (t) UCL	1.008	95% KM (Percentile Bootstrap) UCL	0.987
95% KM (z) UCL	0.995	95% KM Bootstrap t UCL	0.988
90% KM Chebyshev UCL	1.15	95% KM Chebyshev UCL	1.306
97.5% KM Chebyshev UCL	1.522	99% KM Chebyshev UCL	1.947

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.528	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.287	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.332	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	12.99	k star (bias corrected MLE)	6.605
Theta hat (MLE)	0.0701	Theta star (bias corrected MLE)	0.138
nu hat (MLE)	155.9	nu star (bias corrected)	79.26
Mean (detects)	0.91		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.39	Mean	0.803
Maximum	1.2	Median	0.789
SD	0.229	CV	0.285
k hat (MLE)	12.47	k star (bias corrected MLE)	10.02
Theta hat (MLE)	0.0644	Theta star (bias corrected MLE)	0.0802
nu hat (MLE)	374	nu star (bias corrected)	300.5
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (300.54, α)	261.4	Adjusted Chi Square Value (300.54, β)	256.9
95% Gamma Approximate UCL	0.923	95% Gamma Adjusted UCL	0.94

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.806	SD (KM)	0.288
Variance (KM)	0.0831	SE of Mean (KM)	0.115
k hat (KM)	7.821	k star (KM)	6.301
nu hat (KM)	234.6	nu star (KM)	189
theta hat (KM)	0.103	theta star (KM)	0.128
80% gamma percentile (KM)	1.057	90% gamma percentile (KM)	1.235
95% gamma percentile (KM)	1.397	99% gamma percentile (KM)	1.734

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (189.03, α)	158.2	Adjusted Chi Square Value (189.03, β)	154.8
95% KM Approximate Gamma UCL	0.963	95% KM Adjusted Gamma UCL	0.985

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.845	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.826	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.267	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.298	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.798	Mean in Log Scale	-0.263
SD in Original Scale	0.224	SD in Log Scale	0.286
95% t UCL (assumes normality of ROS data)	0.9	95% Percentile Bootstrap UCL	0.891
95% BCA Bootstrap UCL	0.894	95% Bootstrap t UCL	0.908
95% H-UCL (Log ROS)	0.924		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.288	KM Geo Mean	0.75
KM SD (logged)	0.394	95% Critical H Value (KM-Log)	1.962
KM Standard Error of Mean (logged)	0.159	95% H-UCL (KM -Log)	0.996
KM SD (logged)	0.394	95% Critical H Value (KM-Log)	1.962
KM Standard Error of Mean (logged)	0.159		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.661	Mean in Log Scale	0.218
SD in Original Scale	1.197	SD in Log Scale	0.85
95% t UCL (Assumes normality)	2.206	95% H-Stat UCL	3.163

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.008

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2,6-Dimethylnaphthalene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0219	Mean	0.0849
Maximum	0.344	Median	0.0574
SD	0.1	Std. Error of Mean	0.0333
Coefficient of Variation	1.179	Skewness	2.671

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.616	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.36	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.147	95% Adjusted-CLT UCL (Chen-1995)	0.171
		95% Modified-t UCL (Johnson-1978)	0.152

Gamma GOF Test

A-D Test Statistic	0.683	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.242	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.284	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	1.485	k star (bias corrected MLE)	1.064
Theta hat (MLE)	0.0572	Theta star (bias corrected MLE)	0.0798
nu hat (MLE)	26.73	nu star (bias corrected)	19.15
MLE Mean (bias corrected)	0.0849	MLE Sd (bias corrected)	0.0823
		Approximate Chi Square Value (0.05)	10.23
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	8.886

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.159	95% Adjusted Gamma UCL	0.183

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.179	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-3.819	Mean of logged Data	-2.84
Maximum of Logged Data	-1.068	SD of logged Data	0.825

Assuming Lognormal Distribution

95% H-UCL	0.189	90% Chebyshev (MVUE) UCL	0.145
95% Chebyshev (MVUE) UCL	0.175	97.5% Chebyshev (MVUE) UCL	0.217
99% Chebyshev (MVUE) UCL	0.299		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.14	95% BCA Bootstrap UCL	0.178
95% Standard Bootstrap UCL	0.137	95% Bootstrap-t UCL	0.28
95% Hall's Bootstrap UCL	0.346	95% Percentile Bootstrap UCL	0.145
90% Chebyshev(Mean, Sd) UCL	0.185	95% Chebyshev(Mean, Sd) UCL	0.23
97.5% Chebyshev(Mean, Sd) UCL	0.293	99% Chebyshev(Mean, Sd) UCL	0.417

Suggested UCL to Use

Recommendation cannot be provided

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2/3-Methyldibenzothiophene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.00838	Minimum Non-Detect	9.6569E-4

Maximum Detect	0.0248	Maximum Non-Detect	9.6569E-4
Variance Detects	3.4530E-5	Percent Non-Detects	11.11%
Mean Detects	0.0143	SD Detects	0.00588
Median Detects	0.0129	CV Detects	0.411
Skewness Detects	1.061	Kurtosis Detects	-0.0361
Mean of Logged Detects	-4.316	SD of Logged Detects	0.384

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.872	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.749	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.333	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0128	KM Standard Error of Mean	0.00237
90KM SD	0.00666	95% KM (BCA) UCL	0.0167
95% KM (t) UCL	0.0172	95% KM (Percentile Bootstrap) UCL	0.0165
95% KM (z) UCL	0.0167	95% KM Bootstrap t UCL	0.0182
90% KM Chebyshev UCL	0.0199	95% KM Chebyshev UCL	0.0232
97.5% KM Chebyshev UCL	0.0276	99% KM Chebyshev UCL	0.0364

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.376	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.717	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.202	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	7.591	k star (bias corrected MLE)	4.828
Theta hat (MLE)	0.00188	Theta star (bias corrected MLE)	0.00296
nu hat (MLE)	121.5	nu star (bias corrected)	77.24
Mean (detects)	0.0143		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00838	Mean	0.0138
Maximum	0.0248	Median	0.012
SD	0.00568	CV	0.411
k hat (MLE)	7.789	k star (bias corrected MLE)	5.267
Theta hat (MLE)	0.00177	Theta star (bias corrected MLE)	0.00262
nu hat (MLE)	140.2	nu star (bias corrected)	94.81
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (94.81, α)	73.35	Adjusted Chi Square Value (94.81, β)	69.38
95% Gamma Approximate UCL	0.0178	95% Gamma Adjusted UCL	0.0189

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0128	SD (KM)	0.00666
Variance (KM)	4.4378E-5	SE of Mean (KM)	0.00237
k hat (KM)	3.695	k star (KM)	2.537
nu hat (KM)	66.51	nu star (KM)	45.67
theta hat (KM)	0.00347	theta star (KM)	0.00505
80% gamma percentile (KM)	0.0186	90% gamma percentile (KM)	0.0236
95% gamma percentile (KM)	0.0282	99% gamma percentile (KM)	0.0384

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (45.67, α)	31.17	Adjusted Chi Square Value (45.67, β)	28.66
95% KM Approximate Gamma UCL	0.0188	95% KM Adjusted Gamma UCL	0.0204

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.851	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.18	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0133	Mean in Log Scale	-4.421
SD in Original Scale	0.00628	SD in Log Scale	0.479
95% t UCL (assumes normality of ROS data)	0.0172	95% Percentile Bootstrap UCL	0.0166
95% BCA Bootstrap UCL	0.017	95% Bootstrap t UCL	0.0193
95% H-UCL (Log ROS)	0.0196		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.608	KM Geo Mean	0.00997
KM SD (logged)	0.892	95% Critical H Value (KM-Log)	3.004
KM Standard Error of Mean (logged)	0.318	95% H-UCL (KM -Log)	0.0383
KM SD (logged)	0.892	95% Critical H Value (KM-Log)	3.004
KM Standard Error of Mean (logged)	0.318		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0128	Mean in Log Scale	-4.685
SD in Original Scale	0.00717	SD in Log Scale	1.163
95% t UCL (Assumes normality)	0.0172	95% H-Stat UCL	0.0803

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0172

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2-Butanone (MEK)

General Statistics

Total Number of Observations	14	Number of Distinct Observations	11
		Number of Missing Observations	364
Minimum	7	Mean	25.79
Maximum	68	Median	20
SD	16.73	Std. Error of Mean	4.472

Coefficient of Variation	0.649	Skewness	1.642

Normal GOF Test

Shapiro Wilk Test Statistic	0.78	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.825	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.328	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.263	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	33.71	95% Adjusted-CLT UCL (Chen-1995)	35.24
		95% Modified-t UCL (Johnson-1978)	34.03

Gamma GOF Test

A-D Test Statistic	0.914	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.742	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.262	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.23	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.263	k star (bias corrected MLE)	2.612
Theta hat (MLE)	7.902	Theta star (bias corrected MLE)	9.873
nu hat (MLE)	91.37	nu star (bias corrected)	73.13
MLE Mean (bias corrected)	25.79	MLE Sd (bias corrected)	15.96
		Approximate Chi Square Value (0.05)	54.43
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	52.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	34.64	95% Adjusted Gamma UCL	36.05

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.915	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.895	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.224	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.208	Data Not Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.946	Mean of logged Data	3.089
Maximum of Logged Data	4.22	SD of logged Data	0.575

Assuming Lognormal Distribution

95% H-UCL	36.41	90% Chebyshev (MVUE) UCL	37.74
95% Chebyshev (MVUE) UCL	43.27	97.5% Chebyshev (MVUE) UCL	50.93
99% Chebyshev (MVUE) UCL	65.99		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	33.14	95% BCA Bootstrap UCL	34.86
95% Standard Bootstrap UCL	32.91	95% Bootstrap-t UCL	38.5
95% Hall's Bootstrap UCL	36.94	95% Percentile Bootstrap UCL	33.57
90% Chebyshev(Mean, Sd) UCL	39.2	95% Chebyshev(Mean, Sd) UCL	45.28
97.5% Chebyshev(Mean, Sd) UCL	53.72	99% Chebyshev(Mean, Sd) UCL	70.29

Suggested UCL to Use

95% H-UCL	36.41

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2-Hexanone

General Statistics

Total Number of Observations	14	Number of Distinct Observations	5
		Number of Missing Observations	364
Number of Detects	2	Number of Non-Detects	12
Number of Distinct Detects	2	Number of Distinct Non-Detects	3
Minimum Detect	3.3	Minimum Non-Detect	0.01
Maximum Detect	5.7	Maximum Non-Detect	2.5
Variance Detects	2.88	Percent Non-Detects	85.71%
Mean Detects	4.5	SD Detects	1.697
Median Detects	4.5	CV Detects	0.377
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	1.467	SD of Logged Detects	0.386

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only
Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.651	KM Standard Error of Mean	0.618
90KM SD	1.635	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.746	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.668	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	2.506	95% KM Chebyshev UCL	3.346
97.5% KM Chebyshev UCL	4.511	99% KM Chebyshev UCL	6.801

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	13.72	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.328	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	54.88	nu star (bias corrected)	N/A
Mean (detects)	4.5		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.651	SD (KM)	1.635
Variance (KM)	2.674	SE of Mean (KM)	0.618
k hat (KM)	0.159	k star (KM)	0.172
nu hat (KM)	4.443	nu star (KM)	4.824
theta hat (KM)	4.105	theta star (KM)	3.781
80% gamma percentile (KM)	0.786	90% gamma percentile (KM)	1.959
95% gamma percentile (KM)	3.482	99% gamma percentile (KM)	7.781

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0312
Approximate Chi Square Value (4.82, α)	1.072	Adjusted Chi Square Value (4.82, β)	0.86
95% KM Approximate Gamma UCL	2.932	95% KM Adjusted Gamma UCL	3.655

Lognormal GOF Test on Detected Observations Only
Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.025	Mean in Log Scale	-0.749
SD in Original Scale	1.578	SD in Log Scale	1.234
95% t UCL (assumes normality of ROS data)	1.772	95% Percentile Bootstrap UCL	1.759
95% BCA Bootstrap UCL	2.011	95% Bootstrap t UCL	4.07
95% H-UCL (Log ROS)	3.026		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.738	KM Geo Mean	0.0238
KM SD (logged)	2.127	95% Critical H Value (KM-Log)	4.932
KM Standard Error of Mean (logged)	0.804	95% H-UCL (KM -Log)	4.202
KM SD (logged)	2.127	95% Critical H Value (KM-Log)	4.932
KM Standard Error of Mean (logged)	0.804		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.294	Mean in Log Scale	-0.713
SD in Original Scale	1.518	SD in Log Scale	2.096
95% t UCL (Assumes normality)	2.012	95% H-Stat UCL	74.82

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	1.746

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2-Methylanthracene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.00425	Mean	0.013
Maximum	0.0636	Median	0.00684
SD	0.019	Std. Error of Mean	0.00634
Coefficient of Variation	1.462	Skewness	2.958

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.472	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.764	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.456	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.316	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0248	95% Adjusted-CLT UCL (Chen-1995)	0.0301
		95% Modified-t UCL (Johnson-1978)	0.0258

Gamma GOF Test

A-D Test Statistic	1.718	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.738	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.389	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.285	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.274	k star (bias corrected MLE)	0.924
Theta hat (MLE)	0.0102	Theta star (bias corrected MLE)	0.0141
nu hat (MLE)	22.94	nu star (bias corrected)	16.62
MLE Mean (bias corrected)	0.013	MLE Sd (bias corrected)	0.0135
		Approximate Chi Square Value (0.05)	8.404
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	7.206

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0257	95% Adjusted Gamma UCL	0.03

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.693	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.311	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-5.462	Mean of logged Data	-4.783
Maximum of Logged Data	-2.756	SD of logged Data	0.799

Assuming Lognormal Distribution

95% H-UCL	0.0255	90% Chebyshev (MVUE) UCL	0.0201
95% Chebyshev (MVUE) UCL	0.0242	97.5% Chebyshev (MVUE) UCL	0.0299
99% Chebyshev (MVUE) UCL	0.0411		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0234	95% BCA Bootstrap UCL	0.0319
95% Standard Bootstrap UCL	0.0227	95% Bootstrap-t UCL	0.12
95% Hall's Bootstrap UCL	0.0896	95% Percentile Bootstrap UCL	0.0255
90% Chebyshev(Mean, Sd) UCL	0.032	95% Chebyshev(Mean, Sd) UCL	0.0407
97.5% Chebyshev(Mean, Sd) UCL	0.0526	99% Chebyshev(Mean, Sd) UCL	0.0761

Suggested UCL to Use

Recommendation cannot be provided

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2-Methylfluoranthene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.00644	Mean	0.0107
Maximum	0.0174	Median	0.00979
SD	0.00366	Std. Error of Mean	0.00122
Coefficient of Variation	0.341	Skewness	0.879

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.261	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.013	95% Adjusted-CLT UCL (Chen-1995)	0.0131
		95% Modified-t UCL (Johnson-1978)	0.0131

Gamma GOF Test

A-D Test Statistic	0.334	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.234	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	10.5	k star (bias corrected MLE)	7.072
Theta hat (MLE)	0.00102	Theta star (bias corrected MLE)	0.00152
nu hat (MLE)	188.9	nu star (bias corrected)	127.3
MLE Mean (bias corrected)	0.0107	MLE Sd (bias corrected)	0.00404
		Approximate Chi Square Value (0.05)	102.2
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	97.51

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0134	95% Adjusted Gamma UCL	0.014

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.212	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-5.046	Mean of logged Data	-4.581
Maximum of Logged Data	-4.05	SD of logged Data	0.326

Assuming Lognormal Distribution

95% H-UCL	0.0137	90% Chebyshev (MVUE) UCL	0.0142

95% Chebyshev (MVUE) UCL	0.0158	97.5% Chebyshev (MVUE) UCL	0.0181
99% Chebyshev (MVUE) UCL	0.0224		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0128	95% BCA Bootstrap UCL	0.013
95% Standard Bootstrap UCL	0.0126	95% Bootstrap-t UCL	0.0137
95% Hall's Bootstrap UCL	0.0134	95% Percentile Bootstrap UCL	0.0127
90% Chebyshev(Mean, Sd) UCL	0.0144	95% Chebyshev(Mean, Sd) UCL	0.0161
97.5% Chebyshev(Mean, Sd) UCL	0.0184	99% Chebyshev(Mean, Sd) UCL	0.0229

Suggested UCL to Use

95% Student's-t UCL	0.013

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2-Methylnaphthalene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0561	Mean	0.134
Maximum	0.541	Median	0.0732
SD	0.156	Std. Error of Mean	0.0519
Coefficient of Variation	1.165	Skewness	2.81

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.537	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.764	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.363	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.316	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.23	95% Adjusted-CLT UCL (Chen-1995)	0.271
		95% Modified-t UCL (Johnson-1978)	0.238

Gamma GOF Test

A-D Test Statistic	1.389	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.732	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.317	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.283	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.73	k star (bias corrected MLE)	1.228
Theta hat (MLE)	0.0772	Theta star (bias corrected MLE)	0.109
nu hat (MLE)	31.15	nu star (bias corrected)	22.1

MLE Mean (bias corrected)	0.134	MLE Sd (bias corrected)	0.121
		Approximate Chi Square Value (0.05)	12.41
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	10.91

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.238	95% Adjusted Gamma UCL	0.27

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.736	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.284	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.252	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.881	Mean of logged Data	-2.329
Maximum of Logged Data	-0.614	SD of logged Data	0.71

Assuming Lognormal Distribution

95% H-UCL	0.243	90% Chebyshev (MVUE) UCL	0.209
95% Chebyshev (MVUE) UCL	0.249	97.5% Chebyshev (MVUE) UCL	0.305
99% Chebyshev (MVUE) UCL	0.414		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.219	95% BCA Bootstrap UCL	0.289
95% Standard Bootstrap UCL	0.215	95% Bootstrap-t UCL	0.853
95% Hall's Bootstrap UCL	0.571	95% Percentile Bootstrap UCL	0.23
90% Chebyshev(Mean, Sd) UCL	0.289	95% Chebyshev(Mean, Sd) UCL	0.36
97.5% Chebyshev(Mean, Sd) UCL	0.457	99% Chebyshev(Mean, Sd) UCL	0.65

Suggested UCL to Use

Recommendation cannot be provided

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2-Methylphenanthrene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.026	Mean	0.0412
Maximum	0.0647	Median	0.0391
SD	0.0127	Std. Error of Mean	0.00422
Coefficient of Variation	0.308	Skewness	0.959

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.904	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.223	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0491	95% Adjusted-CLT UCL (Chen-1995)	0.0496
		95% Modified-t UCL (Johnson-1978)	0.0493

Gamma GOF Test

A-D Test Statistic	0.33	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.193	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	12.9	k star (bias corrected MLE)	8.677
Theta hat (MLE)	0.00319	Theta star (bias corrected MLE)	0.00475
nu hat (MLE)	232.3	nu star (bias corrected)	156.2
MLE Mean (bias corrected)	0.0412	MLE Sd (bias corrected)	0.014
		Approximate Chi Square Value (0.05)	128.3
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	123

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0502	95% Adjusted Gamma UCL	0.0523

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.174	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-3.651	Mean of logged Data	-3.228
Maximum of Logged Data	-2.737	SD of logged Data	0.293

Assuming Lognormal Distribution

95% H-UCL	0.0509	90% Chebyshev (MVUE) UCL	0.0533
95% Chebyshev (MVUE) UCL	0.0588	97.5% Chebyshev (MVUE) UCL	0.0664
99% Chebyshev (MVUE) UCL	0.0814		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0482	95% BCA Bootstrap UCL	0.0488
95% Standard Bootstrap UCL	0.0477	95% Bootstrap-t UCL	0.0546
95% Hall's Bootstrap UCL	0.101	95% Percentile Bootstrap UCL	0.048
90% Chebyshev(Mean, Sd) UCL	0.0539	95% Chebyshev(Mean, Sd) UCL	0.0596
97.5% Chebyshev(Mean, Sd) UCL	0.0676	99% Chebyshev(Mean, Sd) UCL	0.0832

Suggested UCL to Use

95% Student's-t UCL 0.0491

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

3,6-Dimethylphenanthrene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.00546	Mean	0.0101
Maximum	0.0189	Median	0.00872
SD	0.0044	Std. Error of Mean	0.00147
Coefficient of Variation	0.437	Skewness	1.001

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.906	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.182	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0128	95% Adjusted-CLT UCL (Chen-1995)	0.013
		95% Modified-t UCL (Johnson-1978)	0.0129

Gamma GOF Test

A-D Test Statistic	0.285	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.187	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	6.476	k star (bias corrected MLE)	4.392
Theta hat (MLE)	0.00156	Theta star (bias corrected MLE)	0.00229
nu hat (MLE)	116.6	nu star (bias corrected)	79.05
MLE Mean (bias corrected)	0.0101	MLE Sd (bias corrected)	0.00481
		Approximate Chi Square Value (0.05)	59.56
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	56.01

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0134	95% Adjusted Gamma UCL	0.0142

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level

Lilliefors Test Statistic	0.167	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-5.21	Mean of logged Data	-4.677
Maximum of Logged Data	-3.97	SD of logged Data	0.416

Assuming Lognormal Distribution

95% H-UCL	0.0139	90% Chebyshev (MVUE) UCL	0.0143
95% Chebyshev (MVUE) UCL	0.0162	97.5% Chebyshev (MVUE) UCL	0.0188
99% Chebyshev (MVUE) UCL	0.0241		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0125	95% BCA Bootstrap UCL	0.0129
95% Standard Bootstrap UCL	0.0124	95% Bootstrap-t UCL	0.0139
95% Hall's Bootstrap UCL	0.0132	95% Percentile Bootstrap UCL	0.0125
90% Chebyshev(Mean, Sd) UCL	0.0145	95% Chebyshev(Mean, Sd) UCL	0.0165
97.5% Chebyshev(Mean, Sd) UCL	0.0192	99% Chebyshev(Mean, Sd) UCL	0.0247

Suggested UCL to Use

95% Student's-t UCL	0.0128

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

3-Methylphenanthrene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0245	Mean	0.0391
Maximum	0.0579	Median	0.0379
SD	0.0104	Std. Error of Mean	0.00348
Coefficient of Variation	0.267	Skewness	0.554

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.966	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.167	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0456	95% Adjusted-CLT UCL (Chen-1995)	0.0456
		95% Modified-t UCL (Johnson-1978)	0.0457

Gamma GOF Test

A-D Test Statistic	0.179	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.165	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	16.14	k star (bias corrected MLE)	10.83
Theta hat (MLE)	0.00243	Theta star (bias corrected MLE)	0.00361
nu hat (MLE)	290.5	nu star (bias corrected)	195
MLE Mean (bias corrected)	0.0391	MLE Sd (bias corrected)	0.0119
		Approximate Chi Square Value (0.05)	163.7
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	157.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0466	95% Adjusted Gamma UCL	0.0484

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.984	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.145	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-3.71	Mean of logged Data	-3.272
Maximum of Logged Data	-2.849	SD of logged Data	0.266

Assuming Lognormal Distribution

95% H-UCL	0.0473	90% Chebyshev (MVUE) UCL	0.0496
95% Chebyshev (MVUE) UCL	0.0543	97.5% Chebyshev (MVUE) UCL	0.0609
99% Chebyshev (MVUE) UCL	0.0738		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0449	95% BCA Bootstrap UCL	0.0453
95% Standard Bootstrap UCL	0.0445	95% Bootstrap-t UCL	0.0467
95% Hall's Bootstrap UCL	0.0469	95% Percentile Bootstrap UCL	0.0446
90% Chebyshev(Mean, Sd) UCL	0.0496	95% Chebyshev(Mean, Sd) UCL	0.0543
97.5% Chebyshev(Mean, Sd) UCL	0.0609	99% Chebyshev(Mean, Sd) UCL	0.0738

Suggested UCL to Use

95% Student's-t UCL	0.0456

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

4,4'-DDD

General Statistics

Total Number of Observations	18	Number of Distinct Observations	16
		Number of Missing Observations	386
Number of Detects	3	Number of Non-Detects	15

Number of Distinct Detects	3	Number of Distinct Non-Detects	13
Minimum Detect	0.0049	Minimum Non-Detect	0.003
Maximum Detect	0.021	Maximum Non-Detect	0.056
Variance Detects	8.4823E-5	Percent Non-Detects	83.33%
Mean Detects	0.0104	SD Detects	0.00921
Median Detects	0.0052	CV Detects	0.888
Skewness Detects	1.73	Kurtosis Detects	N/A
Mean of Logged Detects	-4.814	SD of Logged Detects	0.824

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.764	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.379	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00496	KM Standard Error of Mean	0.00153
90KM SD	0.00455	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.00762	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.00748	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.00955	95% KM Chebyshev UCL	0.0116
97.5% KM Chebyshev UCL	0.0145	99% KM Chebyshev UCL	0.0202

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.581	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.637	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.419	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.435	Detected data appear Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.198	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00472	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	13.19	nu star (bias corrected)	N/A
Mean (detects)	0.0104		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0049	Mean	0.0101
Maximum	0.021	Median	0.01
SD	0.00316	CV	0.314
k hat (MLE)	12.41	k star (bias corrected MLE)	10.38
Theta hat (MLE)	8.1078E-4	Theta star (bias corrected MLE)	9.6946E-4
nu hat (MLE)	446.7	nu star (bias corrected)	373.6
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (373.61, α)	329.8	Adjusted Chi Square Value (373.61, β)	325.9
95% Gamma Approximate UCL	0.0114	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00496	SD (KM)	0.00455

Variance (KM)	2.0679E-5	SE of Mean (KM)	0.00153
k hat (KM)	1.188	k star (KM)	1.027
nu hat (KM)	42.75	nu star (KM)	36.96
theta hat (KM)	0.00417	theta star (KM)	0.00483
80% gamma percentile (KM)	0.00796	90% gamma percentile (KM)	0.0113
95% gamma percentile (KM)	0.0147	99% gamma percentile (KM)	0.0225

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (36.96, α)	24.04	Adjusted Chi Square Value (36.96, β)	23.05
95% KM Approximate Gamma UCL	0.00762	95% KM Adjusted Gamma UCL	0.00795

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.781	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.372	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00325	Mean in Log Scale	-6.089
SD in Original Scale	0.00457	SD in Log Scale	0.71
95% t UCL (assumes normality of ROS data)	0.00513	95% Percentile Bootstrap UCL	0.00533
95% BCA Bootstrap UCL	0.00649	95% Bootstrap t UCL	0.0101
95% H-UCL (Log ROS)	0.0043		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.5	KM Geo Mean	0.00409
KM SD (logged)	0.513	95% Critical H Value (KM-Log)	2.033
KM Standard Error of Mean (logged)	0.192	95% H-UCL (KM -Log)	0.006
KM SD (logged)	0.513	95% Critical H Value (KM-Log)	2.033
KM Standard Error of Mean (logged)	0.192		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00847	Mean in Log Scale	-5.214
SD in Original Scale	0.00834	SD in Log Scale	0.966
95% t UCL (Assumes normality)	0.0119	95% H-Stat UCL	0.0159

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00762

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

4,4'-DDE

General Statistics

Total Number of Observations	18	Number of Distinct Observations	13
		Number of Missing Observations	386
Number of Detects	3	Number of Non-Detects	15
Number of Distinct Detects	2	Number of Distinct Non-Detects	11
Minimum Detect	0.0021	Minimum Non-Detect	0.0028
Maximum Detect	0.0047	Maximum Non-Detect	0.056

Variance Detects	2.2533E-6	Percent Non-Detects	83.33%
Mean Detects	0.00297	SD Detects	0.0015
Median Detects	0.0021	CV Detects	0.506
Skewness Detects	1.732	Kurtosis Detects	N/A
Mean of Logged Detects	-5.897	SD of Logged Detects	0.465

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00253	KM Standard Error of Mean	4.8448E-4
90KM SD	9.6896E-4	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.00338	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.00333	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.00399	95% KM Chebyshev UCL	0.00465
97.5% KM Chebyshev UCL	0.00556	99% KM Chebyshev UCL	0.00735

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.62	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.637	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.428	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.433	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	6.659	k star (bias corrected MLE)	N/A
Theta hat (MLE)	4.4550E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	39.95	nu star (bias corrected)	N/A
Mean (detects)	0.00297		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0021	Mean	0.00883
Maximum	0.01	Median	0.01
SD	0.00275	CV	0.311
k hat (MLE)	5.676	k star (bias corrected MLE)	4.767
Theta hat (MLE)	0.00156	Theta star (bias corrected MLE)	0.00185
nu hat (MLE)	204.3	nu star (bias corrected)	171.6
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (171.61, α)	142.3	Adjusted Chi Square Value (171.61, β)	139.8
95% Gamma Approximate UCL	0.0106	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00253	SD (KM)	9.6896E-4
Variance (KM)	9.3889E-7	SE of Mean (KM)	4.8448E-4
k hat (KM)	6.836	k star (KM)	5.733
nu hat (KM)	246.1	nu star (KM)	206.4

theta hat (KM)	3.7061E-4	theta star (KM)	4.4186E-4
80% gamma percentile (KM)	0.00335	90% gamma percentile (KM)	0.00395
95% gamma percentile (KM)	0.00449	99% gamma percentile (KM)	0.00562

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (206.40, α)	174.2	Adjusted Chi Square Value (206.40, β)	171.3
95% KM Approximate Gamma UCL	0.003	95% KM Adjusted Gamma UCL	0.00305

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.75	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.385	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00248	Mean in Log Scale	-6.025
SD in Original Scale	6.7241E-4	SD in Log Scale	0.227
95% t UCL (assumes normality of ROS data)	0.00276	95% Percentile Bootstrap UCL	0.00277
95% BCA Bootstrap UCL	0.00285	95% Bootstrap t UCL	0.00302
95% H-UCL (Log ROS)	0.00274		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.032	KM Geo Mean	0.0024
KM SD (logged)	0.3	95% Critical H Value (KM-Log)	1.853
KM Standard Error of Mean (logged)	0.15	95% H-UCL (KM -Log)	0.00288
KM SD (logged)	0.3	95% Critical H Value (KM-Log)	1.853
KM Standard Error of Mean (logged)	0.15		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00676	Mean in Log Scale	-5.495
SD in Original Scale	0.00805	SD in Log Scale	0.942
95% t UCL (Assumes normality)	0.0101	95% H-Stat UCL	0.0115

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00338

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

4/9-Methylphenanthrene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0174	Mean	0.025
Maximum	0.035	Median	0.024
SD	0.00555	Std. Error of Mean	0.00185

Coefficient of Variation	0.222	Skewness	0.626

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.197	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0284	95% Adjusted-CLT UCL (Chen-1995)	0.0284
		95% Modified-t UCL (Johnson-1978)	0.0285

Gamma GOF Test

A-D Test Statistic	0.204	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.166	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	23.54	k star (bias corrected MLE)	15.76
Theta hat (MLE)	0.00106	Theta star (bias corrected MLE)	0.00158
nu hat (MLE)	423.7	nu star (bias corrected)	283.8
MLE Mean (bias corrected)	0.025	MLE Sd (bias corrected)	0.00629
		Approximate Chi Square Value (0.05)	245.8
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	238.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0289	95% Adjusted Gamma UCL	0.0298

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.978	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.16	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-4.054	Mean of logged Data	-3.711
Maximum of Logged Data	-3.354	SD of logged Data	0.219

Assuming Lognormal Distribution

95% H-UCL	0.0291	90% Chebyshev (MVUE) UCL	0.0305
95% Chebyshev (MVUE) UCL	0.0329	97.5% Chebyshev (MVUE) UCL	0.0364
99% Chebyshev (MVUE) UCL	0.0431		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.028	95% BCA Bootstrap UCL	0.0281
95% Standard Bootstrap UCL	0.0279	95% Bootstrap-t UCL	0.0293
95% Hall's Bootstrap UCL	0.031	95% Percentile Bootstrap UCL	0.0279
90% Chebyshev(Mean, Sd) UCL	0.0305	95% Chebyshev(Mean, Sd) UCL	0.033
97.5% Chebyshev(Mean, Sd) UCL	0.0365	99% Chebyshev(Mean, Sd) UCL	0.0434

Suggested UCL to Use

95% Student's-t UCL 0.0284

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

4-Methyldibenzothiophene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.00802	Minimum Non-Detect	9.6569E-4
Maximum Detect	0.0229	Maximum Non-Detect	9.6569E-4
Variance Detects	2.2930E-5	Percent Non-Detects	11.11%
Mean Detects	0.0129	SD Detects	0.00479
Median Detects	0.0115	CV Detects	0.37
Skewness Detects	1.52	Kurtosis Detects	2.2
Mean of Logged Detects	-4.398	SD of Logged Detects	0.331

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.851	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.749	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.278	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.333	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0116	KM Standard Error of Mean	0.00202
90KM SD	0.00566	95% KM (BCA) UCL	0.0149
95% KM (t) UCL	0.0154	95% KM (Percentile Bootstrap) UCL	0.0148
95% KM (z) UCL	0.0149	95% KM Bootstrap t UCL	0.0159
90% KM Chebyshev UCL	0.0177	95% KM Chebyshev UCL	0.0204
97.5% KM Chebyshev UCL	0.0242	99% KM Chebyshev UCL	0.0317

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.425	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.715	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.241	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.294	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	9.917	k star (bias corrected MLE)	6.282
Theta hat (MLE)	0.00131	Theta star (bias corrected MLE)	0.00206
nu hat (MLE)	158.7	nu star (bias corrected)	100.5
Mean (detects)	0.0129		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00802	Mean	0.0126
Maximum	0.0229	Median	0.0114
SD	0.00459	CV	0.363
k hat (MLE)	10.44	k star (bias corrected MLE)	7.035
Theta hat (MLE)	0.00121	Theta star (bias corrected MLE)	0.00179
nu hat (MLE)	187.9	nu star (bias corrected)	126.6
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (126.62, α)	101.6	Adjusted Chi Square Value (126.62, β)	96.92
95% Gamma Approximate UCL	0.0157	95% Gamma Adjusted UCL	0.0165

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0116	SD (KM)	0.00566
Variance (KM)	3.2017E-5	SE of Mean (KM)	0.00202
k hat (KM)	4.215	k star (KM)	2.884
nu hat (KM)	75.88	nu star (KM)	51.92
theta hat (KM)	0.00276	theta star (KM)	0.00403
80% gamma percentile (KM)	0.0166	90% gamma percentile (KM)	0.0208
95% gamma percentile (KM)	0.0247	99% gamma percentile (KM)	0.0331

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (51.92, α)	36.37	Adjusted Chi Square Value (51.92, β)	33.64
95% KM Approximate Gamma UCL	0.0166	95% KM Adjusted Gamma UCL	0.0179

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.851	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.22	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0121	Mean in Log Scale	-4.488
SD in Original Scale	0.00512	SD in Log Scale	0.41
95% t UCL (assumes normality of ROS data)	0.0153	95% Percentile Bootstrap UCL	0.0149
95% BCA Bootstrap UCL	0.0153	95% Bootstrap t UCL	0.0174
95% H-UCL (Log ROS)	0.0167		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.681	KM Geo Mean	0.00927
KM SD (logged)	0.851	95% Critical H Value (KM-Log)	2.918
KM Standard Error of Mean (logged)	0.303	95% H-UCL (KM -Log)	0.0321
KM SD (logged)	0.851	95% Critical H Value (KM-Log)	2.918
KM Standard Error of Mean (logged)	0.303		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0116	Mean in Log Scale	-4.758
SD in Original Scale	0.00611	SD in Log Scale	1.123

95% t UCL (Assumes normality)	0.0154	95% H-Stat UCL	0.0651

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0154

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Acenaphthene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	22
		Number of Missing Observations	381
Number of Detects	9	Number of Non-Detects	18
Number of Distinct Detects	9	Number of Distinct Non-Detects	13
Minimum Detect	0.0314	Minimum Non-Detect	0.13
Maximum Detect	0.0821	Maximum Non-Detect	420
Variance Detects	3.4829E-4	Percent Non-Detects	66.67%
Mean Detects	0.0587	SD Detects	0.0187
Median Detects	0.0619	CV Detects	0.318
Skewness Detects	-0.119	Kurtosis Detects	-1.426
Mean of Logged Detects	-2.885	SD of Logged Detects	0.344

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0587	KM Standard Error of Mean	0.00622
90KM SD	0.0176	95% KM (BCA) UCL	0.0679
95% KM (t) UCL	0.0693	95% KM (Percentile Bootstrap) UCL	0.0683
95% KM (z) UCL	0.069	95% KM Bootstrap t UCL	0.0701
90% KM Chebyshev UCL	0.0774	95% KM Chebyshev UCL	0.0858
97.5% KM Chebyshev UCL	0.0976	99% KM Chebyshev UCL	0.121

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.29	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.163	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	10.21	k star (bias corrected MLE)	6.882
Theta hat (MLE)	0.00575	Theta star (bias corrected MLE)	0.00853
nu hat (MLE)	183.8	nu star (bias corrected)	123.9
Mean (detects)	0.0587		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0314	Mean	0.058
Maximum	0.0821	Median	0.0573
SD	0.0121	CV	0.208
k hat (MLE)	22.69	k star (bias corrected MLE)	20.19
Theta hat (MLE)	0.00255	Theta star (bias corrected MLE)	0.00287
nu hat (MLE)	1225	nu star (bias corrected)	1090
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (N/A, α)	1015	Adjusted Chi Square Value (N/A, β)	1010
95% Gamma Approximate UCL	0.0623	95% Gamma Adjusted UCL	0.0626

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0587	SD (KM)	0.0176
Variance (KM)	3.0959E-4	SE of Mean (KM)	0.00622
k hat (KM)	11.14	k star (KM)	9.925
nu hat (KM)	601.4	nu star (KM)	535.9
theta hat (KM)	0.00527	theta star (KM)	0.00592
80% gamma percentile (KM)	0.0736	90% gamma percentile (KM)	0.0835
95% gamma percentile (KM)	0.0924	99% gamma percentile (KM)	0.111

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (535.93, α)	483.2	Adjusted Chi Square Value (535.93, β)	480.1
95% KM Approximate Gamma UCL	0.0651	95% KM Adjusted Gamma UCL	0.0656

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.172	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0572	Mean in Log Scale	-2.885
SD in Original Scale	0.0123	SD in Log Scale	0.222
95% t UCL (assumes normality of ROS data)	0.0612	95% Percentile Bootstrap UCL	0.0611
95% BCA Bootstrap UCL	0.061	95% Bootstrap t UCL	0.0613
95% H-UCL (Log ROS)	0.0619		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.885	KM Geo Mean	0.0559
KM SD (logged)	0.324	95% Critical H Value (KM-Log)	1.836
KM Standard Error of Mean (logged)	0.115	95% H-UCL (KM -Log)	0.0662
KM SD (logged)	0.324	95% Critical H Value (KM-Log)	1.836
KM Standard Error of Mean (logged)	0.115		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	10.67	Mean in Log Scale	-1.209
SD in Original Scale	40.83	SD in Log Scale	2.251
95% t UCL (Assumes normality)	24.08	95% H-Stat UCL	26.89

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0693

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Acenaphthylene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	21
		Number of Missing Observations	381
Number of Detects	7	Number of Non-Detects	20
Number of Distinct Detects	7	Number of Distinct Non-Detects	14
Minimum Detect	0.0024	Minimum Non-Detect	0.00117
Maximum Detect	0.0125	Maximum Non-Detect	99
Variance Detects	1.5937E-5	Percent Non-Detects	74.07%
Mean Detects	0.00751	SD Detects	0.00399
Median Detects	0.00733	CV Detects	0.531
Skewness Detects	-0.297	Kurtosis Detects	-1.406
Mean of Logged Detects	-5.062	SD of Logged Detects	0.691

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.184	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0061	KM Standard Error of Mean	0.00151
90KM SD	0.00419	95% KM (BCA) UCL	0.00846
95% KM (t) UCL	0.00868	95% KM (Percentile Bootstrap) UCL	0.00849
95% KM (z) UCL	0.00859	95% KM Bootstrap t UCL	0.00882
90% KM Chebyshev UCL	0.0106	95% KM Chebyshev UCL	0.0127
97.5% KM Chebyshev UCL	0.0155	99% KM Chebyshev UCL	0.0211

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.534	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.712	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.241	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.314	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	3.076	k star (bias corrected MLE)	1.853
Theta hat (MLE)	0.00244	Theta star (bias corrected MLE)	0.00405
nu hat (MLE)	43.06	nu star (bias corrected)	25.94
Mean (detects)	0.00751		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0024	Mean	0.00936
Maximum	0.0125	Median	0.01
SD	0.00222	CV	0.237
k hat (MLE)	9.799	k star (bias corrected MLE)	8.735
Theta hat (MLE)	9.5472E-4	Theta star (bias corrected MLE)	0.00107
nu hat (MLE)	529.1	nu star (bias corrected)	471.7
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (471.67, α)	422.3	Adjusted Chi Square Value (471.67, β)	419.3
95% Gamma Approximate UCL	0.0104	95% Gamma Adjusted UCL	0.0105

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0061	SD (KM)	0.00419
Variance (KM)	1.7567E-5	SE of Mean (KM)	0.00151
k hat (KM)	2.121	k star (KM)	1.91
nu hat (KM)	114.5	nu star (KM)	103.1
theta hat (KM)	0.00288	theta star (KM)	0.0032
80% gamma percentile (KM)	0.00919	90% gamma percentile (KM)	0.012
95% gamma percentile (KM)	0.0147	99% gamma percentile (KM)	0.0207

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (103.14, α)	80.7	Adjusted Chi Square Value (103.14, β)	79.43
95% KM Approximate Gamma UCL	0.0078	95% KM Adjusted Gamma UCL	0.00793

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.825	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.271	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00523	Mean in Log Scale	-5.407
SD in Original Scale	0.00288	SD in Log Scale	0.588
95% t UCL (assumes normality of ROS data)	0.00617	95% Percentile Bootstrap UCL	0.00619
95% BCA Bootstrap UCL	0.00621	95% Bootstrap t UCL	0.00634
95% H-UCL (Log ROS)	0.00676		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.437	KM Geo Mean	0.00435
KM SD (logged)	0.899	95% Critical H Value (KM-Log)	2.393
KM Standard Error of Mean (logged)	0.324	95% H-UCL (KM -Log)	0.00995
KM SD (logged)	0.899	95% Critical H Value (KM-Log)	2.393
KM Standard Error of Mean (logged)	0.324		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.653	Mean in Log Scale	-2.274
SD in Original Scale	9.591	SD in Log Scale	2.881
95% t UCL (Assumes normality)	5.801	95% H-Stat UCL	149.1

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00868

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Acetone

General Statistics

Total Number of Observations	14	Number of Distinct Observations	8
		Number of Missing Observations	364
Minimum	130	Mean	194.3
Maximum	300	Median	175
SD	53.88	Std. Error of Mean	14.4
Coefficient of Variation	0.277	Skewness	0.767

Normal GOF Test

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.825	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.238	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.263	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	219.8	95% Adjusted-CLT UCL (Chen-1995)	221.1
		95% Modified-t UCL (Johnson-1978)	220.3

Gamma GOF Test

A-D Test Statistic	0.575	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.239	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.228	Data Not Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	14.96	k star (bias corrected MLE)	11.81
Theta hat (MLE)	12.98	Theta star (bias corrected MLE)	16.46
nu hat (MLE)	419	nu star (bias corrected)	330.6
MLE Mean (bias corrected)	194.3	MLE Sd (bias corrected)	56.55
		Approximate Chi Square Value (0.05)	289.4
Adjusted Level of Significance	0.0312	Adjusted Chi Square Value	284.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	221.9	95% Adjusted Gamma UCL	225.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.895	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.226	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.208	Data Not Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.868	Mean of logged Data	5.236
Maximum of Logged Data	5.704	SD of logged Data	0.267

Assuming Lognormal Distribution

95% H-UCL	223.4	90% Chebyshev (MVUE) UCL	236
95% Chebyshev (MVUE) UCL	254.9	97.5% Chebyshev (MVUE) UCL	281.2

99% Chebyshev (MVUE) UCL	332.9

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	218	95% BCA Bootstrap UCL	217.9
95% Standard Bootstrap UCL	217	95% Bootstrap-t UCL	224
95% Hall's Bootstrap UCL	219.6	95% Percentile Bootstrap UCL	217.1
90% Chebyshev(Mean, Sd) UCL	237.5	95% Chebyshev(Mean, Sd) UCL	257.1
97.5% Chebyshev(Mean, Sd) UCL	284.2	99% Chebyshev(Mean, Sd) UCL	337.6

Suggested UCL to Use

95% Student's-t UCL	219.8

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Acrolein

General Statistics

Total Number of Observations	18	Number of Distinct Observations	7
		Number of Missing Observations	409
Number of Detects	2	Number of Non-Detects	16
Number of Distinct Detects	2	Number of Distinct Non-Detects	5
Minimum Detect	1	Minimum Non-Detect	0.98
Maximum Detect	1.3	Maximum Non-Detect	140
Variance Detects	0.045	Percent Non-Detects	88.89%
Mean Detects	1.15	SD Detects	0.212
Median Detects	1.15	CV Detects	0.184
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.131	SD of Logged Detects	0.186

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.037	KM Standard Error of Mean	0.0681
90KM SD	0.118	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.155	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.149	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.241	95% KM Chebyshev UCL	1.334
97.5% KM Chebyshev UCL	1.462	99% KM Chebyshev UCL	1.714

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	58.44	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0197	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	233.8	nu star (bias corrected)	N/A
Mean (detects)	1.15		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.037	SD (KM)	0.118

Variance (KM)	0.0139	SE of Mean (KM)	0.0681
k hat (KM)	77.19	k star (KM)	64.36
nu hat (KM)	2779	nu star (KM)	2317
theta hat (KM)	0.0134	theta star (KM)	0.0161
80% gamma percentile (KM)	1.144	90% gamma percentile (KM)	1.205
95% gamma percentile (KM)	1.258	99% gamma percentile (KM)	1.361

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0357
Approximate Chi Square Value (N/A, α)	2206	Adjusted Chi Square Value (N/A, β)	2196
95% KM Approximate Gamma UCL	1.089	95% KM Adjusted Gamma UCL	1.094

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.695	Mean in Log Scale	-0.437
SD in Original Scale	0.279	SD in Log Scale	0.396
95% t UCL (assumes normality of ROS data)	0.81	95% Percentile Bootstrap UCL	0.807
95% BCA Bootstrap UCL	0.815	95% Bootstrap t UCL	0.825
95% H-UCL (Log ROS)	0.84		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.0303	KM Geo Mean	1.031
KM SD (logged)	0.104	95% Critical H Value (KM-Log)	1.735
KM Standard Error of Mean (logged)	0.0601	95% H-UCL (KM -Log)	1.083
KM SD (logged)	0.104	95% Critical H Value (KM-Log)	1.735
KM Standard Error of Mean (logged)	0.0601		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	13.22	Mean in Log Scale	0.779
SD in Original Scale	26.31	SD in Log Scale	1.767
95% t UCL (Assumes normality)	24.01	95% H-Stat UCL	55.07

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	1.155

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Aldrin

General Statistics

Total Number of Observations	18	Number of Distinct Observations	14
		Number of Missing Observations	386
Number of Detects	2	Number of Non-Detects	16
Number of Distinct Detects	2	Number of Distinct Non-Detects	12
Minimum Detect	0.0068	Minimum Non-Detect	4.1000E-4
Maximum Detect	0.0097	Maximum Non-Detect	0.092
Variance Detects	4.2050E-6	Percent Non-Detects	88.89%
Mean Detects	0.00825	SD Detects	0.00205
Median Detects	0.00825	CV Detects	0.249
Skewness Detects	N/A	Kurtosis Detects	N/A

Mean of Logged Detects	-4.813	SD of Logged Detects	0.251

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00177	KM Standard Error of Mean	0.00125
90KM SD	0.00301	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.00395	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.00383	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.00553	95% KM Chebyshev UCL	0.00723
97.5% KM Chebyshev UCL	0.0096	99% KM Chebyshev UCL	0.0142

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	32.04	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.5753E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	128.1	nu star (bias corrected)	N/A
Mean (detects)	0.00825		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00177	SD (KM)	0.00301
Variance (KM)	9.0856E-6	SE of Mean (KM)	0.00125
k hat (KM)	0.345	k star (KM)	0.324
nu hat (KM)	12.41	nu star (KM)	11.68
theta hat (KM)	0.00513	theta star (KM)	0.00546
80% gamma percentile (KM)	0.00276	90% gamma percentile (KM)	0.00517
95% gamma percentile (KM)	0.00789	99% gamma percentile (KM)	0.0149

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0357
Approximate Chi Square Value (11.68, α)	5.015	Adjusted Chi Square Value (11.68, β)	4.602
95% KM Approximate Gamma UCL	0.00412	95% KM Adjusted Gamma UCL	0.00449

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00381	Mean in Log Scale	-5.639
SD in Original Scale	0.00177	SD in Log Scale	0.354
95% t UCL (assumes normality of ROS data)	0.00454	95% Percentile Bootstrap UCL	0.00454
95% BCA Bootstrap UCL	0.00485	95% Bootstrap t UCL	0.00582
95% H-UCL (Log ROS)	0.00446		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-7.278	KM Geo Mean	6.9038E-4
KM SD (logged)	1.134	95% Critical H Value (KM-Log)	2.838
KM Standard Error of Mean (logged)	0.474	95% H-UCL (KM -Log)	0.00287
KM SD (logged)	1.134	95% Critical H Value (KM-Log)	2.838
KM Standard Error of Mean (logged)	0.474		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal **DL/2 Log-Transformed**

Mean in Original Scale	0.0094	Mean in Log Scale	-5.56
SD in Original Scale	0.0122	SD in Log Scale	1.529
95% t UCL (Assumes normality)	0.0144	95% H-Stat UCL	0.045

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 0.00395

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Anthracene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	22
		Number of Missing Observations	381
Number of Detects	9	Number of Non-Detects	18
Number of Distinct Detects	9	Number of Distinct Non-Detects	13
Minimum Detect	0.0202	Minimum Non-Detect	0.12
Maximum Detect	0.0553	Maximum Non-Detect	160
Variance Detects	1.2313E-4	Percent Non-Detects	66.67%
Mean Detects	0.0381	SD Detects	0.0111
Median Detects	0.0398	CV Detects	0.292
Skewness Detects	-0.116	Kurtosis Detects	-0.729
Mean of Logged Detects	-3.311	SD of Logged Detects	0.316

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.131	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0381	KM Standard Error of Mean	0.0037
90KM SD	0.0105	95% KM (BCA) UCL	0.0435
95% KM (t) UCL	0.0444	95% KM (Percentile Bootstrap) UCL	0.0437
95% KM (z) UCL	0.0441	95% KM Bootstrap t UCL	0.0449
90% KM Chebyshev UCL	0.0491	95% KM Chebyshev UCL	0.0542
97.5% KM Chebyshev UCL	0.0612	99% KM Chebyshev UCL	0.0749

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.243	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.156	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	12.1	k star (bias corrected MLE)	8.14
Theta hat (MLE)	0.00315	Theta star (bias corrected MLE)	0.00467
nu hat (MLE)	217.8	nu star (bias corrected)	146.5
Mean (detects)	0.0381		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0202	Mean	0.0376
Maximum	0.0553	Median	0.0373
SD	0.00719	CV	0.191
k hat (MLE)	26.85	k star (bias corrected MLE)	23.9
Theta hat (MLE)	0.0014	Theta star (bias corrected MLE)	0.00157
nu hat (MLE)	1450	nu star (bias corrected)	1290
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (N/A, α)	1208	Adjusted Chi Square Value (N/A, β)	1203
95% Gamma Approximate UCL	0.0402	95% Gamma Adjusted UCL	0.0404

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0381	SD (KM)	0.0105
Variance (KM)	1.0945E-4	SE of Mean (KM)	0.0037
k hat (KM)	13.23	k star (KM)	11.78
nu hat (KM)	714.4	nu star (KM)	636.3
theta hat (KM)	0.00288	theta star (KM)	0.00323
80% gamma percentile (KM)	0.0469	90% gamma percentile (KM)	0.0528
95% gamma percentile (KM)	0.0579	99% gamma percentile (KM)	0.0685

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (636.32, α)	578.8	Adjusted Chi Square Value (636.32, β)	575.3
95% KM Approximate Gamma UCL	0.0418	95% KM Adjusted Gamma UCL	0.0421

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.164	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0372	Mean in Log Scale	-3.311
SD in Original Scale	0.0073	SD in Log Scale	0.204
95% t UCL (assumes normality of ROS data)	0.0396	95% Percentile Bootstrap UCL	0.0395
95% BCA Bootstrap UCL	0.0395	95% Bootstrap t UCL	0.0397
95% H-UCL (Log ROS)	0.04		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.311	KM Geo Mean	0.0365
KM SD (logged)	0.298	95% Critical H Value (KM-Log)	1.819
KM Standard Error of Mean (logged)	0.105	95% H-UCL (KM -Log)	0.0424
KM SD (logged)	0.298	95% Critical H Value (KM-Log)	1.819
KM Standard Error of Mean (logged)	0.105		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4.326	Mean in Log Scale	-1.205
SD in Original Scale	15.49	SD in Log Scale	2.154
95% t UCL (Assumes normality)	9.411	95% H-Stat UCL	18.67

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0444

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Antimony

General Statistics

Total Number of Observations	54	Number of Distinct Observations	47
		Number of Missing Observations	367
Minimum	0.53	Mean	0.66
Maximum	0.904	Median	0.651
SD	0.0815	Std. Error of Mean	0.0111
Coefficient of Variation	0.123	Skewness	1.028

Normal GOF Test

Shapiro Wilk Test Statistic	0.929	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0.00388	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.139	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.678	95% Adjusted-CLT UCL (Chen-1995)	0.68
		95% Modified-t UCL (Johnson-1978)	0.678

Gamma GOF Test

A-D Test Statistic	0.563	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.115	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.121	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	70.86	k star (bias corrected MLE)	66.94
Theta hat (MLE)	0.00931	Theta star (bias corrected MLE)	0.00985
nu hat (MLE)	7653	nu star (bias corrected)	7229
MLE Mean (bias corrected)	0.66	MLE Sd (bias corrected)	0.0806
		Approximate Chi Square Value (0.05)	7032
Adjusted Level of Significance	0.0456	Adjusted Chi Square Value	7027

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.678	95% Adjusted Gamma UCL	0.679

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.959	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0.12	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.107	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.11	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.635	Mean of logged Data	-0.423
Maximum of Logged Data	-0.101	SD of logged Data	0.119

Assuming Lognormal Distribution

95% H-UCL	0.678	90% Chebyshev (MVUE) UCL	0.692
95% Chebyshev (MVUE) UCL	0.706	97.5% Chebyshev (MVUE) UCL	0.726
99% Chebyshev (MVUE) UCL	0.766		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.678	95% BCA Bootstrap UCL	0.679
95% Standard Bootstrap UCL	0.677	95% Bootstrap-t UCL	0.679
95% Hall's Bootstrap UCL	0.68	95% Percentile Bootstrap UCL	0.678
90% Chebyshev(Mean, Sd) UCL	0.693	95% Chebyshev(Mean, Sd) UCL	0.708
97.5% Chebyshev(Mean, Sd) UCL	0.729	99% Chebyshev(Mean, Sd) UCL	0.77

Suggested UCL to Use

95% Student's-t UCL	0.678

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Arsenic

General Statistics

Total Number of Observations	62	Number of Distinct Observations	50
		Number of Missing Observations	361
Minimum	0.962	Mean	2.476
Maximum	3.42	Median	2.53
SD	0.523	Std. Error of Mean	0.0664
Coefficient of Variation	0.211	Skewness	-1.28

Normal GOF Test

Shapiro Wilk Test Statistic	0.86	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	1.1078E-7	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.19	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.13	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.587	95% Adjusted-CLT UCL (Chen-1995)	2.574
		95% Modified-t UCL (Johnson-1978)	2.585

Gamma GOF Test

A-D Test Statistic	4.723	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.75	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.237	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	16.99	k star (bias corrected MLE)	16.18

Theta hat (MLE)	0.146	Theta star (bias corrected MLE)	0.153
nu hat (MLE)	2107	nu star (bias corrected)	2006
MLE Mean (bias corrected)	2.476	MLE Sd (bias corrected)	0.616
		Approximate Chi Square Value (0.05)	1903
Adjusted Level of Significance	0.0461	Adjusted Chi Square Value	1901

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.61	95% Adjusted Gamma UCL	2.614

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.742	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	2.720E-14	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.26	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.103	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.0387	Mean of logged Data	0.877
Maximum of Logged Data	1.23	SD of logged Data	0.267

Assuming Lognormal Distribution

95% H-UCL	2.644	90% Chebyshev (MVUE) UCL	2.747
95% Chebyshev (MVUE) UCL	2.864	97.5% Chebyshev (MVUE) UCL	3.026
99% Chebyshev (MVUE) UCL	3.344		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2.586	95% BCA Bootstrap UCL	2.576
95% Standard Bootstrap UCL	2.583	95% Bootstrap-t UCL	2.576
95% Hall's Bootstrap UCL	2.575	95% Percentile Bootstrap UCL	2.583
90% Chebyshev(Mean, Sd) UCL	2.676	95% Chebyshev(Mean, Sd) UCL	2.766
97.5% Chebyshev(Mean, Sd) UCL	2.891	99% Chebyshev(Mean, Sd) UCL	3.137

Suggested UCL to Use

95% Student's-t UCL	2.587

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Benz(a)anthracene

General Statistics

Total Number of Observations	24	Number of Distinct Observations	19
		Number of Missing Observations	383
Number of Detects	10	Number of Non-Detects	14
Number of Distinct Detects	10	Number of Distinct Non-Detects	10
Minimum Detect	0.0224	Minimum Non-Detect	0.09
Maximum Detect	0.25	Maximum Non-Detect	5.16
Variance Detects	0.00457	Percent Non-Detects	58.33%
Mean Detects	0.0607	SD Detects	0.0676
Median Detects	0.0441	CV Detects	1.115
Skewness Detects	2.973	Kurtosis Detects	9.133
Mean of Logged Detects	-3.091	SD of Logged Detects	0.684

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.538	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.781	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.423	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.304	Detected Data Not Normal at 1% Significance Level	

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0546	KM Standard Error of Mean	0.0158
90KM SD	0.0554	95% KM (BCA) UCL	0.0847
95% KM (t) UCL	0.0817	95% KM (Percentile Bootstrap) UCL	0.0809
95% KM (z) UCL	0.0806	95% KM Bootstrap t UCL	0.14
90% KM Chebyshev UCL	0.102	95% KM Chebyshev UCL	0.123
97.5% KM Chebyshev UCL	0.153	99% KM Chebyshev UCL	0.212

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.176	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.736	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.338	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.27	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.883	k star (bias corrected MLE)	1.385
Theta hat (MLE)	0.0322	Theta star (bias corrected MLE)	0.0438
nu hat (MLE)	37.67	nu star (bias corrected)	27.7
Mean (detects)	0.0607		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0212	Mean	0.0515
Maximum	0.25	Median	0.045
SD	0.0452	CV	0.876
k hat (MLE)	2.946	k star (bias corrected MLE)	2.606
Theta hat (MLE)	0.0175	Theta star (bias corrected MLE)	0.0198
nu hat (MLE)	141.4	nu star (bias corrected)	125.1
Adjusted Level of Significance (β)	0.0392		
Approximate Chi Square Value (125.06, α)	100.2	Adjusted Chi Square Value (125.06, β)	98.67
95% Gamma Approximate UCL	0.0643	95% Gamma Adjusted UCL	0.0653

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0546	SD (KM)	0.0554
Variance (KM)	0.00307	SE of Mean (KM)	0.0158
k hat (KM)	0.972	k star (KM)	0.878
nu hat (KM)	46.64	nu star (KM)	42.14
theta hat (KM)	0.0562	theta star (KM)	0.0622
80% gamma percentile (KM)	0.0888	90% gamma percentile (KM)	0.13
95% gamma percentile (KM)	0.171	99% gamma percentile (KM)	0.269

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (42.14, α)	28.26	Adjusted Chi Square Value (42.14, β)	27.46
95% KM Approximate Gamma UCL	0.0815	95% KM Adjusted Gamma UCL	0.0839

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.815	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.869	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.273	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.241	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0506	Mean in Log Scale	-3.131
SD in Original Scale	0.0438	SD in Log Scale	0.463
95% t UCL (assumes normality of ROS data)	0.066	95% Percentile Bootstrap UCL	0.0678
95% BCA Bootstrap UCL	0.0771	95% Bootstrap t UCL	0.0963
95% H-UCL (Log ROS)	0.0586		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.145	KM Geo Mean	0.0431
KM SD (logged)	0.583	95% Critical H Value (KM-Log)	2.056
KM Standard Error of Mean (logged)	0.175	95% H-UCL (KM -Log)	0.0655
KM SD (logged)	0.583	95% Critical H Value (KM-Log)	2.056
KM Standard Error of Mean (logged)	0.175		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.329	Mean in Log Scale	-1.977
SD in Original Scale	0.54	SD in Log Scale	1.328
95% t UCL (Assumes normality)	0.518	95% H-Stat UCL	0.77

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 0.0817

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzene

General Statistics

Total Number of Observations	25	Number of Distinct Observations	18
		Number of Missing Observations	402
Number of Detects	20	Number of Non-Detects	5
Number of Distinct Detects	16	Number of Distinct Non-Detects	3
Minimum Detect	0.04	Minimum Non-Detect	0.06
Maximum Detect	0.78	Maximum Non-Detect	1.05
Variance Detects	0.0387	Percent Non-Detects	20%
Mean Detects	0.195	SD Detects	0.197
Median Detects	0.13	CV Detects	1.009
Skewness Detects	2.253	Kurtosis Detects	4.678
Mean of Logged Detects	-1.961	SD of Logged Detects	0.773

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.682	**Shapiro Wilk GOF Test**	

1% Shapiro Wilk Critical Value	0.868	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.301	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.223	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.184	KM Standard Error of Mean	0.0409
90KM SD	0.187	95% KM (BCA) UCL	0.254
95% KM (t) UCL	0.254	95% KM (Percentile Bootstrap) UCL	0.251
95% KM (z) UCL	0.251	95% KM Bootstrap t UCL	0.333
90% KM Chebyshev UCL	0.306	95% KM Chebyshev UCL	0.362
97.5% KM Chebyshev UCL	0.439	99% KM Chebyshev UCL	0.591

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.958	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.756	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.215	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.197	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.679	k star (bias corrected MLE)	1.46
Theta hat (MLE)	0.116	Theta star (bias corrected MLE)	0.134
nu hat (MLE)	67.16	nu star (bias corrected)	58.42
Mean (detects)	0.195		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.178
Maximum	0.78	Median	0.13
SD	0.184	CV	1.029
k hat (MLE)	1.445	k star (bias corrected MLE)	1.298
Theta hat (MLE)	0.123	Theta star (bias corrected MLE)	0.137
nu hat (MLE)	72.24	nu star (bias corrected)	64.9
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (64.90, α)	47.37	Adjusted Chi Square Value (64.90, β)	46.34
95% Gamma Approximate UCL	0.244	95% Gamma Adjusted UCL	0.25

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.184	SD (KM)	0.187
Variance (KM)	0.0349	SE of Mean (KM)	0.0409
k hat (KM)	0.968	k star (KM)	0.879
nu hat (KM)	48.42	nu star (KM)	43.94
theta hat (KM)	0.19	theta star (KM)	0.209
80% gamma percentile (KM)	0.299	90% gamma percentile (KM)	0.437
95% gamma percentile (KM)	0.576	99% gamma percentile (KM)	0.904

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (43.94, α)	29.74	Adjusted Chi Square Value (43.94, β)	28.94
95% KM Approximate Gamma UCL	0.271	95% KM Adjusted Gamma UCL	0.279

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.92	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.153	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.176	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.179	Mean in Log Scale	-2.045
SD in Original Scale	0.181	SD in Log Scale	0.769
95% t UCL (assumes normality of ROS data)	0.24	95% Percentile Bootstrap UCL	0.243
95% BCA Bootstrap UCL	0.261	95% Bootstrap t UCL	0.305
95% H-UCL (Log ROS)	0.247		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.037	KM Geo Mean	0.13
KM SD (logged)	0.774	95% Critical H Value (KM-Log)	2.225
KM Standard Error of Mean (logged)	0.171	95% H-UCL (KM -Log)	0.25
KM SD (logged)	0.774	95% Critical H Value (KM-Log)	2.225
KM Standard Error of Mean (logged)	0.171		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.224	Mean in Log Scale	-1.877
SD in Original Scale	0.212	SD in Log Scale	0.886
95% t UCL (Assumes normality)	0.297	95% H-Stat UCL	0.347

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 10% Significance Level

Suggested UCL to Use

KM H-UCL	0.25

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(a)fluoranthene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	8
		Number of Missing Observations	393
Number of Detects	6	Number of Non-Detects	3
Number of Distinct Detects	6	Number of Distinct Non-Detects	2
Minimum Detect	0.00217	Minimum Non-Detect	0.00251
Maximum Detect	0.0151	Maximum Non-Detect	0.00251
Variance Detects	2.3366E-5	Percent Non-Detects	33.33%
Mean Detects	0.00862	SD Detects	0.00483
Median Detects	0.00813	CV Detects	0.561
Skewness Detects	0.0697	Kurtosis Detects	-1.313
Mean of Logged Detects	-4.929	SD of Logged Detects	0.707

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.965	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.713	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.198	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.373	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00647	KM Standard Error of Mean	0.00172
90KM SD	0.00471	95% KM (BCA) UCL	0.00922
95% KM (t) UCL	0.00967	95% KM (Percentile Bootstrap) UCL	0.00917
95% KM (z) UCL	0.0093	95% KM Bootstrap t UCL	0.00982
90% KM Chebyshev UCL	0.0116	95% KM Chebyshev UCL	0.014
97.5% KM Chebyshev UCL	0.0172	99% KM Chebyshev UCL	0.0236

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.255	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.701	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.185	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.335	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	3.015	k star (bias corrected MLE)	1.619
Theta hat (MLE)	0.00286	Theta star (bias corrected MLE)	0.00532
nu hat (MLE)	36.18	nu star (bias corrected)	19.42
Mean (detects)	0.00862		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00217	Mean	0.00908
Maximum	0.0151	Median	0.01
SD	0.00388	CV	0.428
k hat (MLE)	4.357	k star (bias corrected MLE)	2.979
Theta hat (MLE)	0.00208	Theta star (bias corrected MLE)	0.00305
nu hat (MLE)	78.43	nu star (bias corrected)	53.62
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (53.62, α)	37.8	Adjusted Chi Square Value (53.62, β)	35.02
95% Gamma Approximate UCL	0.0129	95% Gamma Adjusted UCL	0.0139

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00647	SD (KM)	0.00471
Variance (KM)	2.2206E-5	SE of Mean (KM)	0.00172
k hat (KM)	1.885	k star (KM)	1.331
nu hat (KM)	33.93	nu star (KM)	23.95
theta hat (KM)	0.00343	theta star (KM)	0.00486
80% gamma percentile (KM)	0.0101	90% gamma percentile (KM)	0.0139
95% gamma percentile (KM)	0.0175	99% gamma percentile (KM)	0.0259

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (23.95, α)	13.81	Adjusted Chi Square Value (23.95, β)	12.22
95% KM Approximate Gamma UCL	0.0112	95% KM Adjusted Gamma UCL	0.0127

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.921	**Shapiro Wilk GOF Test**	

10% Shapiro Wilk Critical Value	0.826	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.298	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00652	Mean in Log Scale	-5.314
SD in Original Scale	0.00496	SD in Log Scale	0.813
95% t UCL (assumes normality of ROS data)	0.00959	95% Percentile Bootstrap UCL	0.00915
95% BCA Bootstrap UCL	0.00941	95% Bootstrap t UCL	0.0104
95% H-UCL (Log ROS)	0.0155		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.33	KM Geo Mean	0.00485
KM SD (logged)	0.774	95% Critical H Value (KM-Log)	2.761
KM Standard Error of Mean (logged)	0.283	95% H-UCL (KM -Log)	0.0139
KM SD (logged)	0.774	95% Critical H Value (KM-Log)	2.761
KM Standard Error of Mean (logged)	0.283		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00616	Mean in Log Scale	-5.513
SD in Original Scale	0.00531	SD in Log Scale	1.039
95% t UCL (Assumes normality)	0.00945	95% H-Stat UCL	0.0235

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00967

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(a)pyrene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	22
		Number of Missing Observations	381
Number of Detects	9	Number of Non-Detects	18
Number of Distinct Detects	9	Number of Distinct Non-Detects	13
Minimum Detect	0.00912	Minimum Non-Detect	0.16
Maximum Detect	0.0563	Maximum Non-Detect	120
Variance Detects	2.0920E-4	Percent Non-Detects	66.67%
Mean Detects	0.0239	SD Detects	0.0145
Median Detects	0.0198	CV Detects	0.604
Skewness Detects	1.529	Kurtosis Detects	2.639
Mean of Logged Detects	-3.874	SD of Logged Detects	0.557

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.87	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.212	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0239	KM Standard Error of Mean	0.00482
90KM SD	0.0136	95% KM (BCA) UCL	0.0327
95% KM (t) UCL	0.0322	95% KM (Percentile Bootstrap) UCL	0.0323
95% KM (z) UCL	0.0319	95% KM Bootstrap t UCL	0.0395
90% KM Chebyshev UCL	0.0384	95% KM Chebyshev UCL	0.045
97.5% KM Chebyshev UCL	0.0541	99% KM Chebyshev UCL	0.0719

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.204	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.726	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.15	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.281	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	3.668	k star (bias corrected MLE)	2.52
Theta hat (MLE)	0.00653	Theta star (bias corrected MLE)	0.0095
nu hat (MLE)	66.03	nu star (bias corrected)	45.36
Mean (detects)	0.0239		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00912	Mean	0.023
Maximum	0.0563	Median	0.0221
SD	0.00931	CV	0.405
k hat (MLE)	7.368	k star (bias corrected MLE)	6.574
Theta hat (MLE)	0.00312	Theta star (bias corrected MLE)	0.00349
nu hat (MLE)	397.8	nu star (bias corrected)	355
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (354.97, α)	312.3	Adjusted Chi Square Value (354.97, β)	309.8
95% Gamma Approximate UCL	0.0261	95% Gamma Adjusted UCL	0.0263

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0239	SD (KM)	0.0136
Variance (KM)	1.8595E-4	SE of Mean (KM)	0.00482
k hat (KM)	3.085	k star (KM)	2.767
nu hat (KM)	166.6	nu star (KM)	149.4
theta hat (KM)	0.00776	theta star (KM)	0.00866
80% gamma percentile (KM)	0.0345	90% gamma percentile (KM)	0.0433
95% gamma percentile (KM)	0.0515	99% gamma percentile (KM)	0.0693

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (149.40, α)	122.1	Adjusted Chi Square Value (149.40, β)	120.6
95% KM Approximate Gamma UCL	0.0293	95% KM Adjusted Gamma UCL	0.0297

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.988	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.116	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0222	Mean in Log Scale	-3.874
SD in Original Scale	0.00907	SD in Log Scale	0.362
95% t UCL (assumes normality of ROS data)	0.0252	95% Percentile Bootstrap UCL	0.0252
95% BCA Bootstrap UCL	0.0259	95% Bootstrap t UCL	0.0267
95% H-UCL (Log ROS)	0.0253		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.874	KM Geo Mean	0.0208
KM SD (logged)	0.525	95% Critical H Value (KM-Log)	1.992
KM Standard Error of Mean (logged)	0.186	95% H-UCL (KM -Log)	0.0293
KM SD (logged)	0.525	95% Critical H Value (KM-Log)	1.992
KM Standard Error of Mean (logged)	0.186		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	3.228	Mean in Log Scale	-1.521
SD in Original Scale	11.62	SD in Log Scale	2.215
95% t UCL (Assumes normality)	7.043	95% H-Stat UCL	17.16

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0322

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	21
		Number of Missing Observations	381
Number of Detects	9	Number of Non-Detects	18
Number of Distinct Detects	9	Number of Distinct Non-Detects	12
Minimum Detect	0.0109	Minimum Non-Detect	0.085
Maximum Detect	0.049	Maximum Non-Detect	100
Variance Detects	1.9763E-4	Percent Non-Detects	66.67%
Mean Detects	0.025	SD Detects	0.0141
Median Detects	0.0177	CV Detects	0.562
Skewness Detects	1.023	Kurtosis Detects	-0.428
Mean of Logged Detects	-3.818	SD of Logged Detects	0.529

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.843	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.253	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.025	KM Standard Error of Mean	0.00469
90KM SD	0.0133	95% KM (BCA) UCL	0.0337
95% KM (t) UCL	0.033	95% KM (Percentile Bootstrap) UCL	0.0334

95% KM (z) UCL	0.0327	95% KM Bootstrap t UCL	0.0427
90% KM Chebyshev UCL	0.0391	95% KM Chebyshev UCL	0.0454
97.5% KM Chebyshev UCL	0.0543	99% KM Chebyshev UCL	0.0716

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.457	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.24	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	4.029	k star (bias corrected MLE)	2.76
Theta hat (MLE)	0.00621	Theta star (bias corrected MLE)	0.00906
nu hat (MLE)	72.51	nu star (bias corrected)	49.68
Mean (detects)	0.025		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0109	Mean	0.0242
Maximum	0.049	Median	0.0233
SD	0.00934	CV	0.387
k hat (MLE)	7.693	k star (bias corrected MLE)	6.863
Theta hat (MLE)	0.00314	Theta star (bias corrected MLE)	0.00352
nu hat (MLE)	415.4	nu star (bias corrected)	370.6
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (370.60, α)	327	Adjusted Chi Square Value (370.60, β)	324.4
95% Gamma Approximate UCL	0.0274	95% Gamma Adjusted UCL	0.0276

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.025	SD (KM)	0.0133
Variance (KM)	1.7567E-4	SE of Mean (KM)	0.00469
k hat (KM)	3.557	k star (KM)	3.186
nu hat (KM)	192.1	nu star (KM)	172.1
theta hat (KM)	0.00703	theta star (KM)	0.00784
80% gamma percentile (KM)	0.0354	90% gamma percentile (KM)	0.0438
95% gamma percentile (KM)	0.0516	99% gamma percentile (KM)	0.0684

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (172.07, α)	142.7	Adjusted Chi Square Value (172.07, β)	141
95% KM Approximate Gamma UCL	0.0301	95% KM Adjusted Gamma UCL	0.0305

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.927	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.213	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0234	Mean in Log Scale	-3.818
SD in Original Scale	0.00907	SD in Log Scale	0.353

95% t UCL (assumes normality of ROS data)	0.0264	95% Percentile Bootstrap UCL	0.0263
95% BCA Bootstrap UCL	0.0267	95% Bootstrap t UCL	0.0272
95% H-UCL (Log ROS)	0.0266		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.818	KM Geo Mean	0.022
KM SD (logged)	0.499	95% Critical H Value (KM-Log)	1.969
KM Standard Error of Mean (logged)	0.176	95% H-UCL (KM -Log)	0.0302
KM SD (logged)	0.499	95% Critical H Value (KM-Log)	1.969
KM Standard Error of Mean (logged)	0.176		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	2.685	Mean in Log Scale	-1.678
SD in Original Scale	9.686	SD in Log Scale	2.143
95% t UCL (Assumes normality)	5.865	95% H-Stat UCL	11.2

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.033

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(b)fluorene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0102	Mean	0.0199
Maximum	0.0406	Median	0.0154
SD	0.01	Std. Error of Mean	0.00334
Coefficient of Variation	0.504	Skewness	1.375

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.84	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.269	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.0261	95% Adjusted-CLT UCL (Chen-1995)	0.027
		95% Modified-t UCL (Johnson-1978)	0.0263

Gamma GOF Test

A-D Test Statistic	0.49	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.235	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	5.363	k star (bias corrected MLE)	3.649
Theta hat (MLE)	0.00371	Theta star (bias corrected MLE)	0.00545
nu hat (MLE)	96.53	nu star (bias corrected)	65.69
MLE Mean (bias corrected)	0.0199	MLE Sd (bias corrected)	0.0104
		Approximate Chi Square Value (0.05)	48.04
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	44.87

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0272	95% Adjusted Gamma UCL	0.0291

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.927	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.206	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-4.586	Mean of logged Data	-4.014
Maximum of Logged Data	-3.204	SD of logged Data	0.448

Assuming Lognormal Distribution

95% H-UCL	0.0282	90% Chebyshev (MVUE) UCL	0.0287
95% Chebyshev (MVUE) UCL	0.0327	97.5% Chebyshev (MVUE) UCL	0.0383
99% Chebyshev (MVUE) UCL	0.0494		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0254	95% BCA Bootstrap UCL	0.0264
95% Standard Bootstrap UCL	0.025	95% Bootstrap-t UCL	0.0321
95% Hall's Bootstrap UCL	0.0321	95% Percentile Bootstrap UCL	0.0255
90% Chebyshev(Mean, Sd) UCL	0.0299	95% Chebyshev(Mean, Sd) UCL	0.0344
97.5% Chebyshev(Mean, Sd) UCL	0.0407	99% Chebyshev(Mean, Sd) UCL	0.0531

Suggested UCL to Use

95% Student's-t UCL	0.0261

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(e)pyrene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Number of Detects	7	Number of Non-Detects	2
Number of Distinct Detects	7	Number of Distinct Non-Detects	2
Minimum Detect	0.0117	Minimum Non-Detect	0.00269

Maximum Detect	0.0523	Maximum Non-Detect	0.00269
Variance Detects	1.9143E-4	Percent Non-Detects	22.22%
Mean Detects	0.0253	SD Detects	0.0138
Median Detects	0.0219	CV Detects	0.546
Skewness Detects	1.358	Kurtosis Detects	2.15
Mean of Logged Detects	-3.792	SD of Logged Detects	0.516

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.884	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0203	KM Standard Error of Mean	0.00529
90KM SD	0.0147	95% KM (BCA) UCL	0.0283
95% KM (t) UCL	0.0301	95% KM (Percentile Bootstrap) UCL	0.0284
95% KM (z) UCL	0.029	95% KM Bootstrap t UCL	0.0325
90% KM Chebyshev UCL	0.0362	95% KM Chebyshev UCL	0.0434
97.5% KM Chebyshev UCL	0.0534	99% KM Chebyshev UCL	0.073

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.242	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.71	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.151	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.313	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	4.442	k star (bias corrected MLE)	2.633
Theta hat (MLE)	0.0057	Theta star (bias corrected MLE)	0.00962
nu hat (MLE)	62.19	nu star (bias corrected)	36.87
Mean (detects)	0.0253		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0219
Maximum	0.0523	Median	0.0204
SD	0.0138	CV	0.627
k hat (MLE)	3.427	k star (bias corrected MLE)	2.359
Theta hat (MLE)	0.0064	Theta star (bias corrected MLE)	0.0093
nu hat (MLE)	61.68	nu star (bias corrected)	42.46
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (42.46, α)	28.52	Adjusted Chi Square Value (42.46, β)	26.13
95% Gamma Approximate UCL	0.0326	95% Gamma Adjusted UCL	0.0356

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0203	SD (KM)	0.0147
Variance (KM)	2.1625E-4	SE of Mean (KM)	0.00529
k hat (KM)	1.906	k star (KM)	1.345
nu hat (KM)	34.31	nu star (KM)	24.21
theta hat (KM)	0.0107	theta star (KM)	0.0151
80% gamma percentile (KM)	0.0318	90% gamma percentile (KM)	0.0435
95% gamma percentile (KM)	0.0549	99% gamma percentile (KM)	0.0808

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (24.21, α)	14.01	Adjusted Chi Square Value (24.21, β)	12.4
95% KM Approximate Gamma UCL	0.0351	95% KM Adjusted Gamma UCL	0.0396

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.144	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0211	Mean in Log Scale	-4.077
SD in Original Scale	0.0146	SD in Log Scale	0.721
95% t UCL (assumes normality of ROS data)	0.0302	95% Percentile Bootstrap UCL	0.029
95% BCA Bootstrap UCL	0.0301	95% Bootstrap t UCL	0.0338
95% H-UCL (Log ROS)	0.0433		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.265	KM Geo Mean	0.0141
KM SD (logged)	0.979	95% Critical H Value (KM-Log)	3.193
KM Standard Error of Mean (logged)	0.353	95% H-UCL (KM -Log)	0.0685
KM SD (logged)	0.979	95% Critical H Value (KM-Log)	3.193
KM Standard Error of Mean (logged)	0.353		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.02	Mean in Log Scale	-4.419
SD in Original Scale	0.016	SD in Log Scale	1.321
95% t UCL (Assumes normality)	0.0299	95% H-Stat UCL	0.186

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0301

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(g,h,i)perylene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	20
		Number of Missing Observations	381
Number of Detects	5	Number of Non-Detects	22
Number of Distinct Detects	5	Number of Distinct Non-Detects	15
Minimum Detect	0.0059	Minimum Non-Detect	0.00251
Maximum Detect	0.0833	Maximum Non-Detect	140

Variance Detects	9.5599E-4	Percent Non-Detects	81.48%
Mean Detects	0.0334	SD Detects	0.0309
Median Detects	0.0252	CV Detects	0.925
Skewness Detects	1.312	Kurtosis Detects	1.532
Mean of Logged Detects	-3.785	SD of Logged Detects	1.033

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.206	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0197	KM Standard Error of Mean	0.00958
90KM SD	0.0257	95% KM (BCA) UCL	0.0375
95% KM (t) UCL	0.036	95% KM (Percentile Bootstrap) UCL	0.0354
95% KM (z) UCL	0.0354	95% KM Bootstrap t UCL	0.0489
90% KM Chebyshev UCL	0.0484	95% KM Chebyshev UCL	0.0614
97.5% KM Chebyshev UCL	0.0795	99% KM Chebyshev UCL	0.115

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.183	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.687	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.174	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.362	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	1.439	k star (bias corrected MLE)	0.709
Theta hat (MLE)	0.0232	Theta star (bias corrected MLE)	0.0471
nu hat (MLE)	14.39	nu star (bias corrected)	7.089
Mean (detects)	0.0334		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0059	Mean	0.0161
Maximum	0.0833	Median	0.01
SD	0.0155	CV	0.966
k hat (MLE)	2.505	k star (bias corrected MLE)	2.252
Theta hat (MLE)	0.00641	Theta star (bias corrected MLE)	0.00714
nu hat (MLE)	135.3	nu star (bias corrected)	121.6
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (121.59, α)	97.12	Adjusted Chi Square Value (121.59, β)	95.73
95% Gamma Approximate UCL	0.0201	95% Gamma Adjusted UCL	0.0204

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0197	SD (KM)	0.0257
Variance (KM)	6.6088E-4	SE of Mean (KM)	0.00958
k hat (KM)	0.586	k star (KM)	0.546
nu hat (KM)	31.66	nu star (KM)	29.48
theta hat (KM)	0.0336	theta star (KM)	0.0361
80% gamma percentile (KM)	0.0324	90% gamma percentile (KM)	0.0523

95% gamma percentile (KM)	0.0733	99% gamma percentile (KM)	0.125

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (29.48, α)	18.08	Adjusted Chi Square Value (29.48, β)	17.51
95% KM Approximate Gamma UCL	0.0321	95% KM Adjusted Gamma UCL	0.0331

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.99	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.139	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0113	Mean in Log Scale	-5.147
SD in Original Scale	0.017	SD in Log Scale	1.166
95% t UCL (assumes normality of ROS data)	0.0169	95% Percentile Bootstrap UCL	0.0173
95% BCA Bootstrap UCL	0.0204	95% Bootstrap t UCL	0.0233
95% H-UCL (Log ROS)	0.0215		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.764	KM Geo Mean	0.00853
KM SD (logged)	1.293	95% Critical H Value (KM-Log)	2.927
KM Standard Error of Mean (logged)	0.482	95% H-UCL (KM -Log)	0.0414
KM SD (logged)	1.293	95% Critical H Value (KM-Log)	2.927
KM Standard Error of Mean (logged)	0.482		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.886	Mean in Log Scale	-1.739
SD in Original Scale	13.53	SD in Log Scale	2.973
95% t UCL (Assumes normality)	8.329	95% H-Stat UCL	403.4

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.036

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzo(k,j)fluoranthene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.00783	Mean	0.0164
Maximum	0.0334	Median	0.0148
SD	0.00781	Std. Error of Mean	0.0026
Coefficient of Variation	0.476	Skewness	1.468

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,

but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).

The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.855	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.291	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0213	95% Adjusted-CLT UCL (Chen-1995)	0.0221
		95% Modified-t UCL (Johnson-1978)	0.0215

Gamma GOF Test

A-D Test Statistic	0.396	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.239	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	5.879	k star (bias corrected MLE)	3.993
Theta hat (MLE)	0.00279	Theta star (bias corrected MLE)	0.00411
nu hat (MLE)	105.8	nu star (bias corrected)	71.88
MLE Mean (bias corrected)	0.0164	MLE Sd (bias corrected)	0.00821
		Approximate Chi Square Value (0.05)	53.36
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	50.01

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0221	95% Adjusted Gamma UCL	0.0236

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.955	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.213	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-4.85	Mean of logged Data	-4.198
Maximum of Logged Data	-3.4	SD of logged Data	0.433

Assuming Lognormal Distribution

95% H-UCL	0.023	90% Chebyshev (MVUE) UCL	0.0235
95% Chebyshev (MVUE) UCL	0.0267	97.5% Chebyshev (MVUE) UCL	0.0312
99% Chebyshev (MVUE) UCL	0.04		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0207	95% BCA Bootstrap UCL	0.0214
95% Standard Bootstrap UCL	0.0204	95% Bootstrap-t UCL	0.0261
95% Hall's Bootstrap UCL	0.0499	95% Percentile Bootstrap UCL	0.0207

90% Chebyshev(Mean, Sd) UCL	0.0242	95% Chebyshev(Mean, Sd) UCL	0.0278
97.5% Chebyshev(Mean, Sd) UCL	0.0327	99% Chebyshev(Mean, Sd) UCL	0.0423

Suggested UCL to Use

95% Student's-t UCL 0.0213

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Benzothiophene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	6
		Number of Missing Observations	393
Number of Detects	4	Number of Non-Detects	5
Number of Distinct Detects	4	Number of Distinct Non-Detects	2
Minimum Detect	0.00288	Minimum Non-Detect	0.00129
Maximum Detect	0.0144	Maximum Non-Detect	0.00129
Variance Detects	2.5249E-5	Percent Non-Detects	55.56%
Mean Detects	0.00715	SD Detects	0.00502
Median Detects	0.00564	CV Detects	0.703
Skewness Detects	1.577	Kurtosis Detects	2.945
Mean of Logged Detects	-5.112	SD of Logged Detects	0.663

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.844	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.687	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.353	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.413	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00389	KM Standard Error of Mean	0.00158
90KM SD	0.00411	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.00683	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.00649	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.00864	95% KM Chebyshev UCL	0.0108
97.5% KM Chebyshev UCL	0.0138	99% KM Chebyshev UCL	0.0196

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.36	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.659	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.311	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.397	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	3.092	k star (bias corrected MLE)	0.94
Theta hat (MLE)	0.00231	Theta star (bias corrected MLE)	0.0076
nu hat (MLE)	24.74	nu star (bias corrected)	7.518
Mean (detects)	0.00715		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00288	Mean	0.00873
Maximum	0.0144	Median	0.01
SD	0.00343	CV	0.392
k hat (MLE)	5.754	k star (bias corrected MLE)	3.91
Theta hat (MLE)	0.00152	Theta star (bias corrected MLE)	0.00223
nu hat (MLE)	103.6	nu star (bias corrected)	70.38
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (70.38, α)	52.06	Adjusted Chi Square Value (70.38, β)	48.76
95% Gamma Approximate UCL	0.0118	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00389	SD (KM)	0.00411
Variance (KM)	1.6894E-5	SE of Mean (KM)	0.00158
k hat (KM)	0.896	k star (KM)	0.671
nu hat (KM)	16.12	nu star (KM)	12.08
theta hat (KM)	0.00434	theta star (KM)	0.0058
80% gamma percentile (KM)	0.0064	90% gamma percentile (KM)	0.00986
95% gamma percentile (KM)	0.0134	99% gamma percentile (KM)	0.022

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (12.08, α)	5.282	Adjusted Chi Square Value (12.08, β)	4.372
95% KM Approximate Gamma UCL	0.0089	95% KM Adjusted Gamma UCL	0.0108

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.792	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.27	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.346	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0036	Mean in Log Scale	-6.331
SD in Original Scale	0.00457	SD in Log Scale	1.289
95% t UCL (assumes normality of ROS data)	0.00643	95% Percentile Bootstrap UCL	0.00613
95% BCA Bootstrap UCL	0.00696	95% Bootstrap t UCL	0.00929
95% H-UCL (Log ROS)	0.0243		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.97	KM Geo Mean	0.00255
KM SD (logged)	0.858	95% Critical H Value (KM-Log)	2.932
KM Standard Error of Mean (logged)	0.33	95% H-UCL (KM -Log)	0.00898
KM SD (logged)	0.858	95% Critical H Value (KM-Log)	2.932
KM Standard Error of Mean (logged)	0.33		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00353	Mean in Log Scale	-6.354
SD in Original Scale	0.00461	SD in Log Scale	1.247
95% t UCL (Assumes normality)	0.00639	95% H-Stat UCL	0.0203

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.00683

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Beryllium

General Statistics

Total Number of Observations	54	Number of Distinct Observations	11
		Number of Missing Observations	367
Number of Detects	23	Number of Non-Detects	31
Number of Distinct Detects	11	Number of Distinct Non-Detects	3
Minimum Detect	0.004	Minimum Non-Detect	0.005
Maximum Detect	0.018	Maximum Non-Detect	0.008
Variance Detects	1.6719E-5	Percent Non-Detects	57.41%
Mean Detects	0.00891	SD Detects	0.00409
Median Detects	0.008	CV Detects	0.459
Skewness Detects	0.768	Kurtosis Detects	-0.196
Mean of Logged Detects	-4.82	SD of Logged Detects	0.458

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.881	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.154	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.209	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00613	KM Standard Error of Mean	4.9540E-4
90KM SD	0.00355	95% KM (BCA) UCL	0.00713
95% KM (t) UCL	0.00696	95% KM (Percentile Bootstrap) UCL	0.00702
95% KM (z) UCL	0.00694	95% KM Bootstrap t UCL	0.00709
90% KM Chebyshev UCL	0.00762	95% KM Chebyshev UCL	0.00829
97.5% KM Chebyshev UCL	0.00922	99% KM Chebyshev UCL	0.0111

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.36	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.746	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.148	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.182	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	5.193	k star (bias corrected MLE)	4.544
Theta hat (MLE)	0.00172	Theta star (bias corrected MLE)	0.00196
nu hat (MLE)	238.9	nu star (bias corrected)	209
Mean (detects)	0.00891		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.004	Mean	0.00954
Maximum	0.018	Median	0.01

SD	0.00269	CV	0.282
k hat (MLE)	11.55	k star (bias corrected MLE)	10.92
Theta hat (MLE)	8.2605E-4	Theta star (bias corrected MLE)	8.7365E-4
nu hat (MLE)	1247	nu star (bias corrected)	1179
Adjusted Level of Significance (β)	0.0456		
Approximate Chi Square Value (N/A, α)	1100	Adjusted Chi Square Value (N/A, β)	1098
95% Gamma Approximate UCL	0.0102	95% Gamma Adjusted UCL	0.0102

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00613	SD (KM)	0.00355
Variance (KM)	1.2617E-5	SE of Mean (KM)	4.9540E-4
k hat (KM)	2.978	k star (KM)	2.824
nu hat (KM)	321.6	nu star (KM)	305
theta hat (KM)	0.00206	theta star (KM)	0.00217
80% gamma percentile (KM)	0.00881	90% gamma percentile (KM)	0.011
95% gamma percentile (KM)	0.0131	99% gamma percentile (KM)	0.0176

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (305.04, α)	265.6	Adjusted Chi Square Value (305.04, β)	264.6
95% KM Approximate Gamma UCL	0.00704	95% KM Adjusted Gamma UCL	0.00707

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.928	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.165	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00597	Mean in Log Scale	-5.285
SD in Original Scale	0.00378	SD in Log Scale	0.563
95% t UCL (assumes normality of ROS data)	0.00683	95% Percentile Bootstrap UCL	0.00684
95% BCA Bootstrap UCL	0.00689	95% Bootstrap t UCL	0.00699
95% H-UCL (Log ROS)	0.00689		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.215	KM Geo Mean	0.00544
KM SD (logged)	0.451	95% Critical H Value (KM-Log)	1.855
KM Standard Error of Mean (logged)	0.0632	95% H-UCL (KM -Log)	0.00675
KM SD (logged)	0.451	95% Critical H Value (KM-Log)	1.855
KM Standard Error of Mean (logged)	0.0632		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00543	Mean in Log Scale	-5.429
SD in Original Scale	0.00404	SD in Log Scale	0.62
95% t UCL (Assumes normality)	0.00635	95% H-Stat UCL	0.00629

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00696

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Biphenyl

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.023	Mean	0.0475
Maximum	0.102	Median	0.0383
SD	0.0296	Std. Error of Mean	0.00985
Coefficient of Variation	0.622	Skewness	1.432

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance, but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7). The Chebyshev UCL often results in gross overestimates of the mean. Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.739	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.365	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0658	95% Adjusted-CLT UCL (Chen-1995)	0.0688
		95% Modified-t UCL (Johnson-1978)	0.0666

Gamma GOF Test

A-D Test Statistic	0.843	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.725	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.318	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.281	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.722	k star (bias corrected MLE)	2.555
Theta hat (MLE)	0.0128	Theta star (bias corrected MLE)	0.0186
nu hat (MLE)	66.99	nu star (bias corrected)	45.99
MLE Mean (bias corrected)	0.0475	MLE Sd (bias corrected)	0.0297
		Approximate Chi Square Value (0.05)	31.43
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	28.92

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0695	95% Adjusted Gamma UCL	0.0756

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.85	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.283	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.773	Mean of logged Data	-3.187
Maximum of Logged Data	-2.282	SD of logged Data	0.534

Assuming Lognormal Distribution

95% H-UCL	0.0733	90% Chebyshev (MVUE) UCL	0.0722
95% Chebyshev (MVUE) UCL	0.0837	97.5% Chebyshev (MVUE) UCL	0.0996

99% Chebyshev (MVUE) UCL	0.131

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0637	95% BCA Bootstrap UCL	0.0678
95% Standard Bootstrap UCL	0.0624	95% Bootstrap-t UCL	0.11
95% Hall's Bootstrap UCL	0.201	95% Percentile Bootstrap UCL	0.0631
90% Chebyshev(Mean, Sd) UCL	0.0771	95% Chebyshev(Mean, Sd) UCL	0.0905
97.5% Chebyshev(Mean, Sd) UCL	0.109	99% Chebyshev(Mean, Sd) UCL	0.146

Suggested UCL to Use

Recommendation cannot be provided

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Bis(2-ethylhexyl) Phthalate

General Statistics

Total Number of Observations	18	Number of Distinct Observations	16
		Number of Missing Observations	390
Number of Detects	11	Number of Non-Detects	7
Number of Distinct Detects	11	Number of Distinct Non-Detects	5
Minimum Detect	4.3	Minimum Non-Detect	1.7
Maximum Detect	95	Maximum Non-Detect	150
Variance Detects	1025	Percent Non-Detects	38.89%
Mean Detects	21.88	SD Detects	32.02
Median Detects	8.2	CV Detects	1.463
Skewness Detects	1.981	Kurtosis Detects	2.512
Mean of Logged Detects	2.447	SD of Logged Detects	1.019

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.556	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.792	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.463	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.291	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	16.18	KM Standard Error of Mean	6.574
90KM SD	25.8	95% KM (BCA) UCL	27.43
95% KM (t) UCL	27.62	95% KM (Percentile Bootstrap) UCL	26.92
95% KM (z) UCL	27	95% KM Bootstrap t UCL	110.7
90% KM Chebyshev UCL	35.9	95% KM Chebyshev UCL	44.84
97.5% KM Chebyshev UCL	57.24	99% KM Chebyshev UCL	81.6

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.025	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.755	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.434	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.263	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.914	k star (bias corrected MLE)	0.725
Theta hat (MLE)	23.95	Theta star (bias corrected MLE)	30.18
nu hat (MLE)	20.1	nu star (bias corrected)	15.95

Mean (detects)	21.88

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	15.13
Maximum	95	Median	7.55
SD	26.29	CV	1.737
k hat (MLE)	0.36	k star (bias corrected MLE)	0.337
Theta hat (MLE)	42.02	Theta star (bias corrected MLE)	44.89
nu hat (MLE)	12.97	nu star (bias corrected)	12.14
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (12.14, α)	5.318	Adjusted Chi Square Value (12.14, β)	4.89
95% Gamma Approximate UCL	34.54	95% Gamma Adjusted UCL	37.56

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	16.18	SD (KM)	25.8
Variance (KM)	665.5	SE of Mean (KM)	6.574
k hat (KM)	0.393	k star (KM)	0.365
nu hat (KM)	14.16	nu star (KM)	13.14
theta hat (KM)	41.13	theta star (KM)	44.35
80% gamma percentile (KM)	25.79	90% gamma percentile (KM)	46.42
95% gamma percentile (KM)	69.38	99% gamma percentile (KM)	127.7

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (13.14, α)	5.984	Adjusted Chi Square Value (13.14, β)	5.526
95% KM Approximate Gamma UCL	35.52	95% KM Adjusted Gamma UCL	38.46

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.713	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.876	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.375	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.231	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	15.86	Mean in Log Scale	2.15
SD in Original Scale	25.84	SD in Log Scale	0.963
95% t UCL (assumes normality of ROS data)	26.46	95% Percentile Bootstrap UCL	25.91
95% BCA Bootstrap UCL	30.97	95% Bootstrap t UCL	109.4
95% H-UCL (Log ROS)	24.99		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	2.135	KM Geo Mean	8.453
KM SD (logged)	0.974	95% Critical H Value (KM-Log)	2.6
KM Standard Error of Mean (logged)	0.263	95% H-UCL (KM -Log)	25.1
KM SD (logged)	0.974	95% Critical H Value (KM-Log)	2.6
KM Standard Error of Mean (logged)	0.263		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	19.3	Mean in Log Scale	2.224
SD in Original Scale	29.34	SD in Log Scale	1.144
95% t UCL (Assumes normality)	31.33	95% H-Stat UCL	39.24

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 27.62

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Bromodichloromethane

General Statistics

Total Number of Observations	18	Number of Distinct Observations	10
		Number of Missing Observations	409
Number of Detects	5	Number of Non-Detects	13
Number of Distinct Detects	5	Number of Distinct Non-Detects	5
Minimum Detect	0.04	Minimum Non-Detect	0.01
Maximum Detect	0.08	Maximum Non-Detect	1.1
Variance Detects	2.5000E-4	Percent Non-Detects	72.22%
Mean Detects	0.06	SD Detects	0.0158
Median Detects	0.06	CV Detects	0.264
Skewness Detects	1.250E-15	Kurtosis Detects	-1.2
Mean of Logged Detects	-2.843	SD of Logged Detects	0.274

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.987	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.136	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0517	KM Standard Error of Mean	0.0103
90KM SD	0.0227	95% KM (BCA) UCL	0.0667
95% KM (t) UCL	0.0697	95% KM (Percentile Bootstrap) UCL	0.0667
95% KM (z) UCL	0.0687	95% KM Bootstrap t UCL	0.0659
90% KM Chebyshev UCL	0.0827	95% KM Chebyshev UCL	0.0968
97.5% KM Chebyshev UCL	0.116	99% KM Chebyshev UCL	0.155

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.185	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.679	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.169	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.357	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	17.29	k star (bias corrected MLE)	7.051
Theta hat (MLE)	0.00347	Theta star (bias corrected MLE)	0.00851
nu hat (MLE)	172.9	nu star (bias corrected)	70.51
Mean (detects)	0.06		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0235	Mean	0.054
Maximum	0.0813	Median	0.0533
SD	0.0165	CV	0.305
k hat (MLE)	10.26	k star (bias corrected MLE)	8.587
Theta hat (MLE)	0.00526	Theta star (bias corrected MLE)	0.00628
nu hat (MLE)	369.4	nu star (bias corrected)	309.1
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (309.15, α)	269.4	Adjusted Chi Square Value (309.15, β)	265.9
95% Gamma Approximate UCL	0.0619	95% Gamma Adjusted UCL	0.0628

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0517	SD (KM)	0.0227
Variance (KM)	5.1389E-4	SE of Mean (KM)	0.0103
k hat (KM)	5.195	k star (KM)	4.366
nu hat (KM)	187	nu star (KM)	157.2
theta hat (KM)	0.00995	theta star (KM)	0.0118
80% gamma percentile (KM)	0.0705	90% gamma percentile (KM)	0.0848
95% gamma percentile (KM)	0.0979	99% gamma percentile (KM)	0.126

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (157.17, α)	129.2	Adjusted Chi Square Value (157.17, β)	126.8
95% KM Approximate Gamma UCL	0.0629	95% KM Adjusted Gamma UCL	0.0641

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.148	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0543	Mean in Log Scale	-2.954
SD in Original Scale	0.0157	SD in Log Scale	0.3
95% t UCL (assumes normality of ROS data)	0.0608	95% Percentile Bootstrap UCL	0.0608
95% BCA Bootstrap UCL	0.0605	95% Bootstrap t UCL	0.061
95% H-UCL (Log ROS)	0.0624		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.136	KM Geo Mean	0.0434
KM SD (logged)	0.694	95% Critical H Value (KM-Log)	2.231
KM Standard Error of Mean (logged)	0.317	95% H-UCL (KM -Log)	0.0804
KM SD (logged)	0.694	95% Critical H Value (KM-Log)	2.231
KM Standard Error of Mean (logged)	0.317		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.153	Mean in Log Scale	-2.423
SD in Original Scale	0.185	SD in Log Scale	1.101
95% t UCL (Assumes normality)	0.229	95% H-Stat UCL	0.342

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0697

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Bromomethane

General Statistics

Total Number of Observations	18	Number of Distinct Observations	6
		Number of Missing Observations	409
Number of Detects	1	Number of Non-Detects	17
Number of Distinct Detects	1	Number of Distinct Non-Detects	6

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Bromomethane was not processed!

Butyl Benzyl Phthalate

General Statistics

Total Number of Observations	15	Number of Distinct Observations	10
		Number of Missing Observations	392
Number of Detects	8	Number of Non-Detects	7
Number of Distinct Detects	6	Number of Distinct Non-Detects	4
Minimum Detect	1.2	Minimum Non-Detect	2.8
Maximum Detect	5.62	Maximum Non-Detect	20
Variance Detects	2.137	Percent Non-Detects	46.67%
Mean Detects	2.165	SD Detects	1.462
Median Detects	1.65	CV Detects	0.675
Skewness Detects	2.362	Kurtosis Detects	5.968
Mean of Logged Detects	0.637	SD of Logged Detects	0.508

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.678	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.749	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.338	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.333	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.11	KM Standard Error of Mean	0.469
90KM SD	1.306	95% KM (BCA) UCL	2.89
95% KM (t) UCL	2.936	95% KM (Percentile Bootstrap) UCL	2.89
95% KM (z) UCL	2.881	95% KM Bootstrap t UCL	4.353
90% KM Chebyshev UCL	3.517	95% KM Chebyshev UCL	4.154
97.5% KM Chebyshev UCL	5.038	99% KM Chebyshev UCL	6.775

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.743	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.719	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.261	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	3.844	k star (bias corrected MLE)	2.486
Theta hat (MLE)	0.563	Theta star (bias corrected MLE)	0.871
nu hat (MLE)	61.5	nu star (bias corrected)	39.77
Mean (detects)	2.165		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	1.2	Mean	2.058
Maximum	5.62	Median	1.7
SD	1.114	CV	0.541
k hat (MLE)	5.482	k star (bias corrected MLE)	4.43
Theta hat (MLE)	0.375	Theta star (bias corrected MLE)	0.465
nu hat (MLE)	164.5	nu star (bias corrected)	132.9
Adjusted Level of Significance (β)	0.0324		
Approximate Chi Square Value (132.91, α)	107.3	Adjusted Chi Square Value (132.91, β)	104.4
95% Gamma Approximate UCL	2.55	95% Gamma Adjusted UCL	2.619

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.11	SD (KM)	1.306
Variance (KM)	1.707	SE of Mean (KM)	0.469
k hat (KM)	2.609	k star (KM)	2.132
nu hat (KM)	78.27	nu star (KM)	63.95
theta hat (KM)	0.809	theta star (KM)	0.99
80% gamma percentile (KM)	3.135	90% gamma percentile (KM)	4.043
95% gamma percentile (KM)	4.906	99% gamma percentile (KM)	6.812

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (63.95, α)	46.55	Adjusted Chi Square Value (63.95, β)	44.73
95% KM Approximate Gamma UCL	2.899	95% KM Adjusted Gamma UCL	3.017

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.838	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.851	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.225	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.026	Mean in Log Scale	0.62
SD in Original Scale	1.083	SD in Log Scale	0.391
95% t UCL (assumes normality of ROS data)	2.519	95% Percentile Bootstrap UCL	2.524
95% BCA Bootstrap UCL	2.725	95% Bootstrap t UCL	3.105
95% H-UCL (Log ROS)	2.462		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.619	KM Geo Mean	1.858
KM SD (logged)	0.459	95% Critical H Value (KM-Log)	2.025
KM Standard Error of Mean (logged)	0.167	95% H-UCL (KM -Log)	2.645
KM SD (logged)	0.459	95% Critical H Value (KM-Log)	2.025
KM Standard Error of Mean (logged)	0.167		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	4.168	Mean in Log Scale	1.128
SD in Original Scale	3.298	SD in Log Scale	0.804
95% t UCL (Assumes normality)	5.668	95% H-Stat UCL	7.218

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Adjusted Gamma UCL	3.017	95% GROS Adjusted Gamma UCL	2.619

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C1-Benzothiophenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	3
		Number of Missing Observations	393
Number of Detects	1	Number of Non-Detects	8
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable C1-Benzothiophenes was not processed!

C1-Chrysenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Number of Detects	7	Number of Non-Detects	2
Number of Distinct Detects	7	Number of Distinct Non-Detects	2
Minimum Detect	0.0179	Minimum Non-Detect	0.0016
Maximum Detect	0.0359	Maximum Non-Detect	0.0016
Variance Detects	5.3217E-5	Percent Non-Detects	22.22%
Mean Detects	0.0262	SD Detects	0.0073
Median Detects	0.0239	CV Detects	0.278
Skewness Detects	0.388	Kurtosis Detects	-1.522
Mean of Logged Detects	-3.674	SD of Logged Detects	0.278

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.9	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level	

Lilliefors Test Statistic	0.199	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0208	KM Standard Error of Mean	0.00426
90KM SD	0.0118	95% KM (BCA) UCL	0.0271
95% KM (t) UCL	0.0287	95% KM (Percentile Bootstrap) UCL	0.0271
95% KM (z) UCL	0.0278	95% KM Bootstrap t UCL	0.0271
90% KM Chebyshev UCL	0.0335	95% KM Chebyshev UCL	0.0393
97.5% KM Chebyshev UCL	0.0474	99% KM Chebyshev UCL	0.0632

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.339	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.19	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.312	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	15.24	k star (bias corrected MLE)	8.803
Theta hat (MLE)	0.00172	Theta star (bias corrected MLE)	0.00298
nu hat (MLE)	213.3	nu star (bias corrected)	123.2
Mean (detects)	0.0262		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0105	Mean	0.0227
Maximum	0.0359	Median	0.0233
SD	0.00938	CV	0.413
k hat (MLE)	5.964	k star (bias corrected MLE)	4.05
Theta hat (MLE)	0.00381	Theta star (bias corrected MLE)	0.00561
nu hat (MLE)	107.3	nu star (bias corrected)	72.9
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (72.90, α)	54.24	Adjusted Chi Square Value (72.90, β)	50.86
95% Gamma Approximate UCL	0.0306	95% Gamma Adjusted UCL	0.0326

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0208	SD (KM)	0.0118
Variance (KM)	1.4029E-4	SE of Mean (KM)	0.00426
k hat (KM)	3.07	k star (KM)	2.12
nu hat (KM)	55.25	nu star (KM)	38.17
theta hat (KM)	0.00676	theta star (KM)	0.00979
80% gamma percentile (KM)	0.0309	90% gamma percentile (KM)	0.0398
95% gamma percentile (KM)	0.0483	99% gamma percentile (KM)	0.0671

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (38.17, α)	25.02	Adjusted Chi Square Value (38.17, β)	22.8
95% KM Approximate Gamma UCL	0.0317	95% KM Adjusted Gamma UCL	0.0347

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.168	**Lilliefors GOF Test**

10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0232	Mean in Log Scale	-3.826
SD in Original Scale	0.00866	SD in Log Scale	0.386
95% t UCL (assumes normality of ROS data)	0.0286	95% Percentile Bootstrap UCL	0.0278
95% BCA Bootstrap UCL	0.0277	95% Bootstrap t UCL	0.0292
95% H-UCL (Log ROS)	0.0313		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.289	KM Geo Mean	0.0137
KM SD (logged)	1.171	95% Critical H Value (KM-Log)	3.632
KM Standard Error of Mean (logged)	0.422	95% H-UCL (KM -Log)	0.123
KM SD (logged)	1.171	95% Critical H Value (KM-Log)	3.632
KM Standard Error of Mean (logged)	0.422		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0206	Mean in Log Scale	-4.442
SD in Original Scale	0.0129	SD in Log Scale	1.543
95% t UCL (Assumes normality)	0.0286	95% H-Stat UCL	0.464

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0287

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C1-Decalins

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.294	Mean	0.472
Maximum	1.169	Median	0.38
SD	0.288	Std. Error of Mean	0.0961
Coefficient of Variation	0.611	Skewness	2.188

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.674	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.354	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.651	95% Adjusted-CLT UCL (Chen-1995)	0.705
		95% Modified-t UCL (Johnson-1978)	0.663

Gamma GOF Test

A-D Test Statistic	1.047	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.724	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.318	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.28	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.482	k star (bias corrected MLE)	3.062
Theta hat (MLE)	0.105	Theta star (bias corrected MLE)	0.154
nu hat (MLE)	80.67	nu star (bias corrected)	55.11
MLE Mean (bias corrected)	0.472	MLE Sd (bias corrected)	0.27
		Approximate Chi Square Value (0.05)	39.05
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	36.22

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.667	95% Adjusted Gamma UCL	0.719

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.778	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.286	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.224	Mean of logged Data	-0.866
Maximum of Logged Data	0.156	SD of logged Data	0.466

Assuming Lognormal Distribution

95% H-UCL	0.674	90% Chebyshev (MVUE) UCL	0.682
95% Chebyshev (MVUE) UCL	0.781	97.5% Chebyshev (MVUE) UCL	0.918
99% Chebyshev (MVUE) UCL	1.189		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.631	95% BCA Bootstrap UCL	0.717
95% Standard Bootstrap UCL	0.62	95% Bootstrap-t UCL	1.213
95% Hall's Bootstrap UCL	1.419	95% Percentile Bootstrap UCL	0.633
90% Chebyshev(Mean, Sd) UCL	0.761	95% Chebyshev(Mean, Sd) UCL	0.891
97.5% Chebyshev(Mean, Sd) UCL	1.073	99% Chebyshev(Mean, Sd) UCL	1.429

Suggested UCL to Use

Recommendation cannot be provided

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C1-Dibenzothiophenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393

Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.0191	Minimum Non-Detect	6.6998E-4
Maximum Detect	0.0358	Maximum Non-Detect	6.6998E-4
Variance Detects	3.1233E-5	Percent Non-Detects	11.11%
Mean Detects	0.0286	SD Detects	0.00559
Median Detects	0.0294	CV Detects	0.196
Skewness Detects	-0.478	Kurtosis Detects	-0.537
Mean of Logged Detects	-3.573	SD of Logged Detects	0.209

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.969	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.749	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.17	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.333	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0255	KM Standard Error of Mean	0.00359
90KM SD	0.0101	95% KM (BCA) UCL	0.0303
95% KM (t) UCL	0.0321	95% KM (Percentile Bootstrap) UCL	0.0305
95% KM (z) UCL	0.0314	95% KM Bootstrap t UCL	0.0303
90% KM Chebyshev UCL	0.0362	95% KM Chebyshev UCL	0.0411
97.5% KM Chebyshev UCL	0.0479	99% KM Chebyshev UCL	0.0612

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.236	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.716	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.193	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.294	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	27.62	k star (bias corrected MLE)	17.35
Theta hat (MLE)	0.00103	Theta star (bias corrected MLE)	0.00165
nu hat (MLE)	442	nu star (bias corrected)	277.6
Mean (detects)	0.0286		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0163	Mean	0.0272
Maximum	0.0358	Median	0.0277
SD	0.00664	CV	0.244
k hat (MLE)	16.99	k star (bias corrected MLE)	11.4
Theta hat (MLE)	0.0016	Theta star (bias corrected MLE)	0.00239
nu hat (MLE)	305.8	nu star (bias corrected)	205.2
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (205.23, α)	173.1	Adjusted Chi Square Value (205.23, β)	166.8

95% Gamma Approximate UCL	0.0323	95% Gamma Adjusted UCL	0.0335

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0255	SD (KM)	0.0101
Variance (KM)	1.0124E-4	SE of Mean (KM)	0.00359
k hat (KM)	6.413	k star (KM)	4.35
nu hat (KM)	115.4	nu star (KM)	78.29
theta hat (KM)	0.00397	theta star (KM)	0.00586
80% gamma percentile (KM)	0.0348	90% gamma percentile (KM)	0.0419
95% gamma percentile (KM)	0.0483	99% gamma percentile (KM)	0.0621

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (78.29, α)	58.91	Adjusted Chi Square Value (78.29, β)	55.37
95% KM Approximate Gamma UCL	0.0339	95% KM Adjusted Gamma UCL	0.036

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.851	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.186	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0273	Mean in Log Scale	-3.629
SD in Original Scale	0.00651	SD in Log Scale	0.258
95% t UCL (assumes normality of ROS data)	0.0313	95% Percentile Bootstrap UCL	0.0306
95% BCA Bootstrap UCL	0.0303	95% Bootstrap t UCL	0.0311
95% H-UCL (Log ROS)	0.0328		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.988	KM Geo Mean	0.0185
KM SD (logged)	1.188	95% Critical H Value (KM-Log)	3.672
KM Standard Error of Mean (logged)	0.423	95% H-UCL (KM -Log)	0.176
KM SD (logged)	1.188	95% Critical H Value (KM-Log)	3.672
KM Standard Error of Mean (logged)	0.423		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0254	Mean in Log Scale	-4.065
SD in Original Scale	0.0108	SD in Log Scale	1.489
95% t UCL (Assumes normality)	0.0321	95% H-Stat UCL	0.531

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0321

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C1-Fluoranthenes/Pyrenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393

Minimum	0.0403	Mean	0.0711
Maximum	0.126	Median	0.063
SD	0.0275	Std. Error of Mean	0.00918
Coefficient of Variation	0.387	Skewness	1.093

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.258	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0882	95% Adjusted-CLT UCL (Chen-1995)	0.0898
		95% Modified-t UCL (Johnson-1978)	0.0887

Gamma GOF Test

A-D Test Statistic	0.4	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.227	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	8.414	k star (bias corrected MLE)	5.684
Theta hat (MLE)	0.00845	Theta star (bias corrected MLE)	0.0125
nu hat (MLE)	151.5	nu star (bias corrected)	102.3
MLE Mean (bias corrected)	0.0711	MLE Sd (bias corrected)	0.0298
		Approximate Chi Square Value (0.05)	79.97
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	75.81

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.091	95% Adjusted Gamma UCL	0.096

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.203	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-3.211	Mean of logged Data	-2.704
Maximum of Logged Data	-2.072	SD of logged Data	0.362

Assuming Lognormal Distribution

95% H-UCL	0.0933	90% Chebyshev (MVUE) UCL	0.0968
95% Chebyshev (MVUE) UCL	0.108	97.5% Chebyshev (MVUE) UCL	0.125
99% Chebyshev (MVUE) UCL	0.157		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0862	95% BCA Bootstrap UCL	0.0885
95% Standard Bootstrap UCL	0.0851	95% Bootstrap-t UCL	0.0953
95% Hall's Bootstrap UCL	0.0901	95% Percentile Bootstrap UCL	0.0862
90% Chebyshev(Mean, Sd) UCL	0.0986	95% Chebyshev(Mean, Sd) UCL	0.111
97.5% Chebyshev(Mean, Sd) UCL	0.128	99% Chebyshev(Mean, Sd) UCL	0.162

Suggested UCL to Use

95% Student's-t UCL	0.0882

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C1-Fluorenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0298	Mean	0.0474
Maximum	0.0729	Median	0.0427
SD	0.0144	Std. Error of Mean	0.00481
Coefficient of Variation	0.304	Skewness	0.775

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.92	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.184	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0564	95% Adjusted-CLT UCL (Chen-1995)	0.0567
		95% Modified-t UCL (Johnson-1978)	0.0566

Gamma GOF Test

A-D Test Statistic	0.301	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.175	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	12.91	k star (bias corrected MLE)	8.678
Theta hat (MLE)	0.00368	Theta star (bias corrected MLE)	0.00547
nu hat (MLE)	232.3	nu star (bias corrected)	156.2
MLE Mean (bias corrected)	0.0474	MLE Sd (bias corrected)	0.0161

		Approximate Chi Square Value (0.05)	128.3
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	123

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0578	95% Adjusted Gamma UCL	0.0603

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.157	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-3.515	Mean of logged Data	-3.088
Maximum of Logged Data	-2.618	SD of logged Data	0.294

Assuming Lognormal Distribution

95% H-UCL	0.0587	90% Chebyshev (MVUE) UCL	0.0614
95% Chebyshev (MVUE) UCL	0.0678	97.5% Chebyshev (MVUE) UCL	0.0766
99% Chebyshev (MVUE) UCL	0.0939		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0554	95% BCA Bootstrap UCL	0.0561
95% Standard Bootstrap UCL	0.0549	95% Bootstrap-t UCL	0.0599
95% Hall's Bootstrap UCL	0.0603	95% Percentile Bootstrap UCL	0.055
90% Chebyshev(Mean, Sd) UCL	0.0619	95% Chebyshev(Mean, Sd) UCL	0.0684
97.5% Chebyshev(Mean, Sd) UCL	0.0775	99% Chebyshev(Mean, Sd) UCL	0.0953

Suggested UCL to Use

95% Student's-t UCL	0.0564

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C1-Naphthalenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0671	Mean	0.154
Maximum	0.605	Median	0.0847
SD	0.173	Std. Error of Mean	0.0577
Coefficient of Variation	1.127	Skewness	2.774

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.549	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.764	Data Not Normal at 1% Significance Level	

Lilliefors Test Statistic	0.366	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.316	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.261	95% Adjusted-CLT UCL (Chen-1995)	0.306
		95% Modified-t UCL (Johnson-1978)	0.27

Gamma GOF Test

A-D Test Statistic	1.328	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.732	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.323	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.283	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.802	k star (bias corrected MLE)	1.275
Theta hat (MLE)	0.0853	Theta star (bias corrected MLE)	0.12
nu hat (MLE)	32.43	nu star (bias corrected)	22.96
MLE Mean (bias corrected)	0.154	MLE Sd (bias corrected)	0.136
		Approximate Chi Square Value (0.05)	13.06
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	11.51

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.27	95% Adjusted Gamma UCL	0.306

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.742	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.269	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.252	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.701	Mean of logged Data	-2.176
Maximum of Logged Data	-0.502	SD of logged Data	0.7

Assuming Lognormal Distribution

95% H-UCL	0.277	90% Chebyshev (MVUE) UCL	0.241
95% Chebyshev (MVUE) UCL	0.287	97.5% Chebyshev (MVUE) UCL	0.35
99% Chebyshev (MVUE) UCL	0.474		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.249	95% BCA Bootstrap UCL	0.325
95% Standard Bootstrap UCL	0.244	95% Bootstrap-t UCL	0.902
95% Hall's Bootstrap UCL	0.638	95% Percentile Bootstrap UCL	0.261
90% Chebyshev(Mean, Sd) UCL	0.327	95% Chebyshev(Mean, Sd) UCL	0.405
97.5% Chebyshev(Mean, Sd) UCL	0.514	99% Chebyshev(Mean, Sd) UCL	0.728

Suggested UCL to Use

Recommendation cannot be provided

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C1-Phenanthrenes/Anthracenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0679	Mean	0.105
Maximum	0.175	Median	0.0975
SD	0.0352	Std. Error of Mean	0.0117
Coefficient of Variation	0.336	Skewness	1.278

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.841	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.319	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data Not Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.126	95% Adjusted-CLT UCL (Chen-1995)	0.129
		95% Modified-t UCL (Johnson-1978)	0.127

Gamma GOF Test

A-D Test Statistic	0.565	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.286	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Data Not Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	11.42	k star (bias corrected MLE)	7.687
Theta hat (MLE)	0.00916	Theta star (bias corrected MLE)	0.0136
nu hat (MLE)	205.5	nu star (bias corrected)	138.4
MLE Mean (bias corrected)	0.105	MLE Sd (bias corrected)	0.0377
		Approximate Chi Square Value (0.05)	112.2
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	107.2

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.129	95% Adjusted Gamma UCL	0.135

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.904	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.266	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data Not Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-2.69	Mean of logged Data	-2.302
Maximum of Logged Data	-1.744	SD of logged Data	0.307

Assuming Lognormal Distribution

95% H-UCL	0.131	90% Chebyshev (MVUE) UCL	0.137
95% Chebyshev (MVUE) UCL	0.151	97.5% Chebyshev (MVUE) UCL	0.172
99% Chebyshev (MVUE) UCL	0.211		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.124	95% BCA Bootstrap UCL	0.128
95% Standard Bootstrap UCL	0.123	95% Bootstrap-t UCL	0.152
95% Hall's Bootstrap UCL	0.279	95% Percentile Bootstrap UCL	0.124
90% Chebyshev(Mean, Sd) UCL	0.14	95% Chebyshev(Mean, Sd) UCL	0.156
97.5% Chebyshev(Mean, Sd) UCL	0.178	99% Chebyshev(Mean, Sd) UCL	0.221

Suggested UCL to Use

95% Student's-t UCL	0.126

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C20-TAS

General Statistics

Total Number of Observations	9	Number of Distinct Observations	3
		Number of Missing Observations	393
Number of Detects	1	Number of Non-Detects	8
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable C20-TAS was not processed!

C21-TAS

General Statistics

Total Number of Observations	9	Number of Distinct Observations	5
		Number of Missing Observations	393
Number of Detects	3	Number of Non-Detects	6
Number of Distinct Detects	3	Number of Distinct Non-Detects	2
Minimum Detect	0.00767	Minimum Non-Detect	0.0026
Maximum Detect	0.0087	Maximum Non-Detect	0.0026
Variance Detects	2.6303E-7	Percent Non-Detects	66.67%
Mean Detects	0.00819	SD Detects	5.1286E-4
Median Detects	0.00822	CV Detects	0.0626
Skewness Detects	-0.196	Kurtosis Detects	N/A
Mean of Logged Detects	-4.806	SD of Logged Detects	0.0628

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.999	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.184	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00446	KM Standard Error of Mean	0.00108
90KM SD	0.00265	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.00647	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.00624	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.00771	95% KM Chebyshev UCL	0.00918
97.5% KM Chebyshev UCL	0.0112	99% KM Chebyshev UCL	0.0152

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.249	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.635	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.229	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	381.2	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.1492E-5	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	2287	nu star (bias corrected)	N/A
Mean (detects)	0.00819		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00767	Mean	0.0094
Maximum	0.01	Median	0.01
SD	9.3887E-4	CV	0.0999
k hat (MLE)	105.5	k star (bias corrected MLE)	70.43
Theta hat (MLE)	8.9049E-5	Theta star (bias corrected MLE)	1.3343E-4
nu hat (MLE)	1900	nu star (bias corrected)	1268
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (N/A, α)	1186	Adjusted Chi Square Value (N/A, β)	1169
95% Gamma Approximate UCL	0.01	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00446	SD (KM)	0.00265
Variance (KM)	7.0127E-6	SE of Mean (KM)	0.00108
k hat (KM)	2.842	k star (KM)	1.969
nu hat (KM)	51.16	nu star (KM)	35.44

theta hat (KM)	0.00157	theta star (KM)	0.00227
80% gamma percentile (KM)	0.0067	90% gamma percentile (KM)	0.00871
95% gamma percentile (KM)	0.0106	99% gamma percentile (KM)	0.0149

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (35.44, α)	22.82	Adjusted Chi Square Value (35.44, β)	20.7
95% KM Approximate Gamma UCL	0.00693	95% KM Adjusted Gamma UCL	0.00764

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.997	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00696	Mean in Log Scale	-4.977
SD in Original Scale	0.00103	SD in Log Scale	0.146
95% t UCL (assumes normality of ROS data)	0.0076	95% Percentile Bootstrap UCL	0.00753
95% BCA Bootstrap UCL	0.00756	95% Bootstrap t UCL	0.00772
95% H-UCL (Log ROS)	0.00767		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.57	KM Geo Mean	0.00381
KM SD (logged)	0.541	95% Critical H Value (KM-Log)	2.3
KM Standard Error of Mean (logged)	0.221	95% H-UCL (KM -Log)	0.00685
KM SD (logged)	0.541	95% Critical H Value (KM-Log)	2.3
KM Standard Error of Mean (logged)	0.221		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0036	Mean in Log Scale	-6.032
SD in Original Scale	0.00346	SD in Log Scale	0.92
95% t UCL (Assumes normality)	0.00574	95% H-Stat UCL	0.00994

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00647

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C26(20R)/C27(20S)-TAS

General Statistics

Total Number of Observations	9	Number of Distinct Observations	5
		Number of Missing Observations	393
Number of Detects	3	Number of Non-Detects	6
Number of Distinct Detects	3	Number of Distinct Non-Detects	2
Minimum Detect	0.0366	Minimum Non-Detect	0.0026
Maximum Detect	0.0604	Maximum Non-Detect	0.0026
Variance Detects	1.4197E-4	Percent Non-Detects	66.67%
Mean Detects	0.0484	SD Detects	0.0119
Median Detects	0.0484	CV Detects	0.246
Skewness Detects	0.0222	Kurtosis Detects	N/A

Mean of Logged Detects	-3.048	SD of Logged Detects	0.252

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	1	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.175	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0179	KM Standard Error of Mean	0.00912
90KM SD	0.0223	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0348	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0329	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0452	95% KM Chebyshev UCL	0.0576
97.5% KM Chebyshev UCL	0.0748	99% KM Chebyshev UCL	0.109

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.248	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.635	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.228	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	24.23	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.002	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	145.4	nu star (bias corrected)	N/A
Mean (detects)	0.0484		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0242
Maximum	0.0604	Median	0.0129
SD	0.0194	CV	0.801
k hat (MLE)	2.059	k star (bias corrected MLE)	1.447
Theta hat (MLE)	0.0117	Theta star (bias corrected MLE)	0.0167
nu hat (MLE)	37.07	nu star (bias corrected)	26.05
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (26.05, α)	15.41	Adjusted Chi Square Value (26.05, β)	13.72
95% Gamma Approximate UCL	0.0409	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0179	SD (KM)	0.0223
Variance (KM)	4.9853E-4	SE of Mean (KM)	0.00912

k hat (KM)	0.641	k star (KM)	0.502
nu hat (KM)	11.54	nu star (KM)	9.029
theta hat (KM)	0.0279	theta star (KM)	0.0356
80% gamma percentile (KM)	0.0294	90% gamma percentile (KM)	0.0483
95% gamma percentile (KM)	0.0686	99% gamma percentile (KM)	0.118

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (9.03, α)	3.344	Adjusted Chi Square Value (9.03, β)	2.657
95% KM Approximate Gamma UCL	0.0483	95% KM Adjusted Gamma UCL	0.0608

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.995	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.198	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0279	Mean in Log Scale	-3.734
SD in Original Scale	0.017	SD in Log Scale	0.583
95% t UCL (assumes normality of ROS data)	0.0385	95% Percentile Bootstrap UCL	0.0374
95% BCA Bootstrap UCL	0.0387	95% Bootstrap t UCL	0.0448
95% H-UCL (Log ROS)	0.0464		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.984	KM Geo Mean	0.00684
KM SD (logged)	1.374	95% Critical H Value (KM-Log)	4.124
KM Standard Error of Mean (logged)	0.561	95% H-UCL (KM -Log)	0.13
KM SD (logged)	1.374	95% Critical H Value (KM-Log)	4.124
KM Standard Error of Mean (logged)	0.561		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.017	Mean in Log Scale	-5.446
SD in Original Scale	0.0243	SD in Log Scale	1.803
95% t UCL (Assumes normality)	0.0321	95% H-Stat UCL	0.603

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0348

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C26(20S)-TAS

General Statistics

Total Number of Observations	9	Number of Distinct Observations	5
		Number of Missing Observations	393
Number of Detects	3	Number of Non-Detects	6
Number of Distinct Detects	3	Number of Distinct Non-Detects	2
Minimum Detect	0.00713	Minimum Non-Detect	0.0026
Maximum Detect	0.0147	Maximum Non-Detect	0.0026
Variance Detects	1.4389E-5	Percent Non-Detects	66.67%
Mean Detects	0.011	SD Detects	0.00379

Median Detects	0.0112	CV Detects	0.344
Skewness Detects	-0.215	Kurtosis Detects	N/A
Mean of Logged Detects	-4.551	SD of Logged Detects	0.366

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.998	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.186	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0054	KM Standard Error of Mean	0.00178
90KM SD	0.00435	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.00871	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.00833	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0107	95% KM Chebyshev UCL	0.0131
97.5% KM Chebyshev UCL	0.0165	99% KM Chebyshev UCL	0.0231

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.262	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.635	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.235	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.432	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	11.84	k star (bias corrected MLE)	N/A
Theta hat (MLE)	9.3027E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	71.04	nu star (bias corrected)	N/A
Mean (detects)	0.011		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00713	Mean	0.0103
Maximum	0.0147	Median	0.01
SD	0.00196	CV	0.19
k hat (MLE)	32.8	k star (bias corrected MLE)	21.94
Theta hat (MLE)	3.1520E-4	Theta star (bias corrected MLE)	4.7120E-4
nu hat (MLE)	590.4	nu star (bias corrected)	394.9
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (394.91, α)	349.8	Adjusted Chi Square Value (394.91, β)	340.9
95% Gamma Approximate UCL	0.0117	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0054	SD (KM)	0.00435
Variance (KM)	1.8930E-5	SE of Mean (KM)	0.00178
k hat (KM)	1.543	k star (KM)	1.103
nu hat (KM)	27.77	nu star (KM)	19.85
theta hat (KM)	0.0035	theta star (KM)	0.0049
80% gamma percentile (KM)	0.00863	90% gamma percentile (KM)	0.0121
95% gamma percentile (KM)	0.0156	99% gamma percentile (KM)	0.0237

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (19.85, α)	10.74	Adjusted Chi Square Value (19.85, β)	9.358
95% KM Approximate Gamma UCL	0.00999	95% KM Adjusted Gamma UCL	0.0115

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.98	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.231	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00542	Mean in Log Scale	-5.533
SD in Original Scale	0.00469	SD in Log Scale	0.835
95% t UCL (assumes normality of ROS data)	0.00832	95% Percentile Bootstrap UCL	0.00807
95% BCA Bootstrap UCL	0.00856	95% Bootstrap t UCL	0.0113
95% H-UCL (Log ROS)	0.0131		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.485	KM Geo Mean	0.00415
KM SD (logged)	0.683	95% Critical H Value (KM-Log)	2.589
KM Standard Error of Mean (logged)	0.279	95% H-UCL (KM -Log)	0.00978
KM SD (logged)	0.683	95% Critical H Value (KM-Log)	2.589
KM Standard Error of Mean (logged)	0.279		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00454	Mean in Log Scale	-5.947
SD in Original Scale	0.00521	SD in Log Scale	1.063
95% t UCL (Assumes normality)	0.00777	95% H-Stat UCL	0.0164

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00871

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C28(20S)-TAS

General Statistics

Total Number of Observations	9	Number of Distinct Observations	5
		Number of Missing Observations	393
Number of Detects	3	Number of Non-Detects	6
Number of Distinct Detects	3	Number of Distinct Non-Detects	2
Minimum Detect	0.0151	Minimum Non-Detect	0.0026
Maximum Detect	0.0199	Maximum Non-Detect	0.0026

Variance Detects	6.3269E-6	Percent Non-Detects	66.67%
Mean Detects	0.0179	SD Detects	0.00252
Median Detects	0.0188	CV Detects	0.14
Skewness Detects	-1.396	Kurtosis Detects	N/A
Mean of Logged Detects	-4.027	SD of Logged Detects	0.146

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.905	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.305	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00771	KM Standard Error of Mean	0.00299
90KM SD	0.00733	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0133	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0126	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0167	95% KM Chebyshev UCL	0.0208
97.5% KM Chebyshev UCL	0.0264	99% KM Chebyshev UCL	0.0375

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.395	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.634	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.343	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	72.58	k star (bias corrected MLE)	N/A
Theta hat (MLE)	2.4725E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	435.5	nu star (bias corrected)	N/A
Mean (detects)	0.0179		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.013
Maximum	0.0199	Median	0.0108
SD	0.00397	CV	0.306
k hat (MLE)	13.61	k star (bias corrected MLE)	9.147
Theta hat (MLE)	9.5550E-4	Theta star (bias corrected MLE)	0.00142
nu hat (MLE)	245	nu star (bias corrected)	164.7
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (164.65, α)	136	Adjusted Chi Square Value (164.65, β)	130.5
95% Gamma Approximate UCL	0.0157	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00771	SD (KM)	0.00733
Variance (KM)	5.3735E-5	SE of Mean (KM)	0.00299
k hat (KM)	1.108	k star (KM)	0.812
nu hat (KM)	19.94	nu star (KM)	14.62
theta hat (KM)	0.00697	theta star (KM)	0.0095
80% gamma percentile (KM)	0.0126	90% gamma percentile (KM)	0.0187
95% gamma percentile (KM)	0.0249	99% gamma percentile (KM)	0.0395

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (14.62, α)	7.001	Adjusted Chi Square Value (14.62, β)	5.925
95% KM Approximate Gamma UCL	0.0161	95% KM Adjusted Gamma UCL	0.019

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.315	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0129	Mean in Log Scale	-4.393
SD in Original Scale	0.00419	SD in Log Scale	0.312
95% t UCL (assumes normality of ROS data)	0.0155	95% Percentile Bootstrap UCL	0.0152
95% BCA Bootstrap UCL	0.0155	95% Bootstrap t UCL	0.0165
95% H-UCL (Log ROS)	0.0162		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.311	KM Geo Mean	0.00494
KM SD (logged)	0.91	95% Critical H Value (KM-Log)	3.043
KM Standard Error of Mean (logged)	0.372	95% H-UCL (KM -Log)	0.0199
KM SD (logged)	0.91	95% Critical H Value (KM-Log)	3.043
KM Standard Error of Mean (logged)	0.372		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00685	Mean in Log Scale	-5.773
SD in Original Scale	0.00842	SD in Log Scale	1.311
95% t UCL (Assumes normality)	0.0121	95% H-Stat UCL	0.0462

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0133

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C29-Hopane

General Statistics

Total Number of Observations	9	Number of Distinct Observations	4
		Number of Missing Observations	393
Number of Detects	2	Number of Non-Detects	7
Number of Distinct Detects	2	Number of Distinct Non-Detects	2

Minimum Detect	0.104	Minimum Non-Detect	0.00819
Maximum Detect	0.187	Maximum Non-Detect	0.00819
Variance Detects	0.00346	Percent Non-Detects	77.78%
Mean Detects	0.145	SD Detects	0.0588
Median Detects	0.145	CV Detects	0.405
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-1.973	SD of Logged Detects	0.417

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only
Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0386	KM Standard Error of Mean	0.0284
90KM SD	0.0602	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0914	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0853	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.124	95% KM Chebyshev UCL	0.162
97.5% KM Chebyshev UCL	0.216	99% KM Chebyshev UCL	0.321

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	11.82	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0123	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	47.29	nu star (bias corrected)	N/A
Mean (detects)	0.145		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0386	SD (KM)	0.0602
Variance (KM)	0.00363	SE of Mean (KM)	0.0284
k hat (KM)	0.411	k star (KM)	0.348
nu hat (KM)	7.404	nu star (KM)	6.27
theta hat (KM)	0.0939	theta star (KM)	0.111
80% gamma percentile (KM)	0.0611	90% gamma percentile (KM)	0.112
95% gamma percentile (KM)	0.168	99% gamma percentile (KM)	0.313

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0231
Approximate Chi Square Value (6.27, α)	1.779	Adjusted Chi Square Value (6.27, β)	1.322
95% KM Approximate Gamma UCL	0.136	95% KM Adjusted Gamma UCL	0.183

Lognormal GOF Test on Detected Observations Only
Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0459	Mean in Log Scale	-3.756
SD in Original Scale	0.0609	SD in Log Scale	1.208
95% t UCL (assumes normality of ROS data)	0.0836	95% Percentile Bootstrap UCL	0.0814
95% BCA Bootstrap UCL	0.0931	95% Bootstrap t UCL	0.202

95% H-UCL (Log ROS)	0.237

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.176	KM Geo Mean	0.0154
KM SD (logged)	1.186	95% Critical H Value (KM-Log)	3.665
KM Standard Error of Mean (logged)	0.559	95% H-UCL (KM -Log)	0.144
KM SD (logged)	1.186	95% Critical H Value (KM-Log)	3.665
KM Standard Error of Mean (logged)	0.559		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0354	Mean in Log Scale	-4.714
SD in Original Scale	0.0656	SD in Log Scale	1.561
95% t UCL (Assumes normality)	0.0761	95% H-Stat UCL	0.383

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	0.0914

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C2-Benzothiophenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	3
		Number of Missing Observations	393
Number of Detects	1	Number of Non-Detects	8
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable C2-Benzothiophenes was not processed!

C2-Chrysenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	3
		Number of Missing Observations	393
Number of Detects	1	Number of Non-Detects	8
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable C2-Chrysenes was not processed!

C2-Decalins

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393

Minimum	0.426	Mean	0.653
Maximum	1.127	Median	0.617
SD	0.21	Std. Error of Mean	0.07
Coefficient of Variation	0.322	Skewness	1.595

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.85	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.294	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.783	95% Adjusted-CLT UCL (Chen-1995)	0.808
		95% Modified-t UCL (Johnson-1978)	0.79

Gamma GOF Test

A-D Test Statistic	0.429	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.26	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	12.8	k star (bias corrected MLE)	8.61
Theta hat (MLE)	0.051	Theta star (bias corrected MLE)	0.0758
nu hat (MLE)	230.5	nu star (bias corrected)	155
MLE Mean (bias corrected)	0.653	MLE Sd (bias corrected)	0.223
		Approximate Chi Square Value (0.05)	127.2
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	121.9

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.796	95% Adjusted Gamma UCL	0.83

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.242	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-0.854	Mean of logged Data	-0.466
Maximum of Logged Data	0.12	SD of logged Data	0.289

Assuming Lognormal Distribution

95% H-UCL	0.803	90% Chebyshev (MVUE) UCL	0.84
95% Chebyshev (MVUE) UCL	0.926	97.5% Chebyshev (MVUE) UCL	1.045
99% Chebyshev (MVUE) UCL	1.278		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.768	95% BCA Bootstrap UCL	0.798
95% Standard Bootstrap UCL	0.76	95% Bootstrap-t UCL	0.896
95% Hall's Bootstrap UCL	1.481	95% Percentile Bootstrap UCL	0.77
90% Chebyshev(Mean, Sd) UCL	0.863	95% Chebyshev(Mean, Sd) UCL	0.958
97.5% Chebyshev(Mean, Sd) UCL	1.09	99% Chebyshev(Mean, Sd) UCL	1.35

Suggested UCL to Use

95% Student's-t UCL	0.783

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C2-Dibenzothiophenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.0208	Minimum Non-Detect	0.00134
Maximum Detect	0.0403	Maximum Non-Detect	0.00134
Variance Detects	5.4746E-5	Percent Non-Detects	11.11%
Mean Detects	0.0277	SD Detects	0.0074
Median Detects	0.0253	CV Detects	0.267
Skewness Detects	1.042	Kurtosis Detects	-0.403
Mean of Logged Detects	-3.614	SD of Logged Detects	0.25

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.842	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.749	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.235	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.333	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0248	KM Standard Error of Mean	0.00376
90KM SD	0.0105	95% KM (BCA) UCL	0.0306
95% KM (t) UCL	0.0318	95% KM (Percentile Bootstrap) UCL	0.0305
95% KM (z) UCL	0.031	95% KM Bootstrap t UCL	0.0309
90% KM Chebyshev UCL	0.0361	95% KM Chebyshev UCL	0.0412
97.5% KM Chebyshev UCL	0.0483	99% KM Chebyshev UCL	0.0622

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.541	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.716	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.224	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.294	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	17.7	k star (bias corrected MLE)	11.15
Theta hat (MLE)	0.00157	Theta star (bias corrected MLE)	0.00249
nu hat (MLE)	283.2	nu star (bias corrected)	178.3
Mean (detects)	0.0277		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0121	Mean	0.026
Maximum	0.0403	Median	0.0235
SD	0.00866	CV	0.333
k hat (MLE)	9.645	k star (bias corrected MLE)	6.504
Theta hat (MLE)	0.00269	Theta star (bias corrected MLE)	0.00399
nu hat (MLE)	173.6	nu star (bias corrected)	117.1
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (117.07, α)	93.09	Adjusted Chi Square Value (117.07, β)	88.58
95% Gamma Approximate UCL	0.0327	95% Gamma Adjusted UCL	0.0343

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0248	SD (KM)	0.0105
Variance (KM)	1.1129E-4	SE of Mean (KM)	0.00376
k hat (KM)	5.52	k star (KM)	3.754
nu hat (KM)	99.36	nu star (KM)	67.57
theta hat (KM)	0.00449	theta star (KM)	0.0066
80% gamma percentile (KM)	0.0344	90% gamma percentile (KM)	0.0419
95% gamma percentile (KM)	0.0489	99% gamma percentile (KM)	0.0637

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (67.57, α)	49.65	Adjusted Chi Square Value (67.57, β)	46.43
95% KM Approximate Gamma UCL	0.0337	95% KM Adjusted Gamma UCL	0.0361

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.879	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.851	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.207	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0263	Mean in Log Scale	-3.682
SD in Original Scale	0.00817	SD in Log Scale	0.309
95% t UCL (assumes normality of ROS data)	0.0313	95% Percentile Bootstrap UCL	0.0306
95% BCA Bootstrap UCL	0.031	95% Bootstrap t UCL	0.0337
95% H-UCL (Log ROS)	0.0329		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.948	KM Geo Mean	0.0193
KM SD (logged)	0.968	95% Critical H Value (KM-Log)	3.169
KM Standard Error of Mean (logged)	0.345	95% H-UCL (KM -Log)	0.0913
KM SD (logged)	0.968	95% Critical H Value (KM-Log)	3.169
KM Standard Error of Mean (logged)	0.345		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0247	Mean in Log Scale	-4.025
SD in Original Scale	0.0114	SD in Log Scale	1.253
95% t UCL (Assumes normality)	0.0318	95% H-Stat UCL	0.214

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0318

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C2-Fluoranthenes/Pyrenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.0145	Minimum Non-Detect	0.00247
Maximum Detect	0.0428	Maximum Non-Detect	0.00247
Variance Detects	1.0239E-4	Percent Non-Detects	11.11%
Mean Detects	0.0268	SD Detects	0.0101
Median Detects	0.0257	CV Detects	0.378
Skewness Detects	0.29	Kurtosis Detects	-0.901
Mean of Logged Detects	-3.687	SD of Logged Detects	0.398

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.749	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.141	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.333	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0241	KM Standard Error of Mean	0.00419
90KM SD	0.0117	95% KM (BCA) UCL	0.0304
95% KM (t) UCL	0.0319	95% KM (Percentile Bootstrap) UCL	0.0304
95% KM (z) UCL	0.031	95% KM Bootstrap t UCL	0.0316
90% KM Chebyshev UCL	0.0366	95% KM Chebyshev UCL	0.0423
97.5% KM Chebyshev UCL	0.0502	99% KM Chebyshev UCL	0.0657

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.247	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.717	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.168	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	7.662	k star (bias corrected MLE)	4.872
Theta hat (MLE)	0.00349	Theta star (bias corrected MLE)	0.00549
nu hat (MLE)	122.6	nu star (bias corrected)	77.95
Mean (detects)	0.0268		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0249
Maximum	0.0428	Median	0.025
SD	0.011	CV	0.441
k hat (MLE)	5.341	k star (bias corrected MLE)	3.635
Theta hat (MLE)	0.00466	Theta star (bias corrected MLE)	0.00685
nu hat (MLE)	96.13	nu star (bias corrected)	65.42
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (65.42, α)	47.81	Adjusted Chi Square Value (65.42, β)	44.65
95% Gamma Approximate UCL	0.0341	95% Gamma Adjusted UCL	0.0365

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0241	SD (KM)	0.0117
Variance (KM)	1.3796E-4	SE of Mean (KM)	0.00419
k hat (KM)	4.199	k star (KM)	2.873
nu hat (KM)	75.58	nu star (KM)	51.72
theta hat (KM)	0.00573	theta star (KM)	0.00838
80% gamma percentile (KM)	0.0345	90% gamma percentile (KM)	0.0431
95% gamma percentile (KM)	0.0511	99% gamma percentile (KM)	0.0686

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (51.72, α)	36.2	Adjusted Chi Square Value (51.72, β)	33.49
95% KM Approximate Gamma UCL	0.0344	95% KM Adjusted Gamma UCL	0.0372

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.935	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.851	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.161	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0248	Mean in Log Scale	-3.796
SD in Original Scale	0.0111	SD in Log Scale	0.496
95% t UCL (assumes normality of ROS data)	0.0317	95% Percentile Bootstrap UCL	0.0307
95% BCA Bootstrap UCL	0.0305	95% Bootstrap t UCL	0.032
95% H-UCL (Log ROS)	0.0375		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.945	KM Geo Mean	0.0194
KM SD (logged)	0.808	95% Critical H Value (KM-Log)	2.83
KM Standard Error of Mean (logged)	0.288	95% H-UCL (KM -Log)	0.0603
KM SD (logged)	0.808	95% Critical H Value (KM-Log)	2.83
KM Standard Error of Mean (logged)	0.288		

DL/2 Statistics

DL/2 Normal **DL/2 Log-Transformed**

Mean in Original Scale	0.0239	Mean in Log Scale	-4.022
SD in Original Scale	0.0127	SD in Log Scale	1.07
95% t UCL (Assumes normality)	0.0318	95% H-Stat UCL	0.115

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0319

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C2-Fluorenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0324	Mean	0.0999
Maximum	0.163	Median	0.0986
SD	0.0506	Std. Error of Mean	0.0169
Coefficient of Variation	0.506	Skewness	-0.041

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.898	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.192	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.131	95% Adjusted-CLT UCL (Chen-1995)	0.127
		95% Modified-t UCL (Johnson-1978)	0.131

Gamma GOF Test

A-D Test Statistic	0.469	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.726	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.196	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.281	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	3.661	k star (bias corrected MLE)	2.515
Theta hat (MLE)	0.0273	Theta star (bias corrected MLE)	0.0397
nu hat (MLE)	65.9	nu star (bias corrected)	45.27
MLE Mean (bias corrected)	0.0999	MLE Sd (bias corrected)	0.063
		Approximate Chi Square Value (0.05)	30.83
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	28.34

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.147	95% Adjusted Gamma UCL	0.16

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.885	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.197	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-3.429	Mean of logged Data	-2.446
Maximum of Logged Data	-1.812	SD of logged Data	0.602

Assuming Lognormal Distribution

95% H-UCL	0.175	90% Chebyshev (MVUE) UCL	0.164
95% Chebyshev (MVUE) UCL	0.192	97.5% Chebyshev (MVUE) UCL	0.231
99% Chebyshev (MVUE) UCL	0.308		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.128	95% BCA Bootstrap UCL	0.126
95% Standard Bootstrap UCL	0.126	95% Bootstrap-t UCL	0.131
95% Hall's Bootstrap UCL	0.124	95% Percentile Bootstrap UCL	0.126
90% Chebyshev(Mean, Sd) UCL	0.151	95% Chebyshev(Mean, Sd) UCL	0.173
97.5% Chebyshev(Mean, Sd) UCL	0.205	99% Chebyshev(Mean, Sd) UCL	0.268

Suggested UCL to Use

95% Student's-t UCL	0.131

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

C2-Naphthalenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0632	Mean	0.236
Maximum	0.699	Median	0.164
SD	0.205	Std. Error of Mean	0.0685
Coefficient of Variation	0.87	Skewness	1.775

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance, but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7). The Chebyshev UCL often results in gross overestimates of the mean. Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.776	**Shapiro Wilk GOF Test**	

1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.292	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.363	95% Adjusted-CLT UCL (Chen-1995)	0.392
		95% Modified-t UCL (Johnson-1978)	0.37

Gamma GOF Test

A-D Test Statistic	0.479	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.73	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.201	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.282	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	1.998	k star (bias corrected MLE)	1.406
Theta hat (MLE)	0.118	Theta star (bias corrected MLE)	0.168
nu hat (MLE)	35.97	nu star (bias corrected)	25.31
MLE Mean (bias corrected)	0.236	MLE Sd (bias corrected)	0.199
		Approximate Chi Square Value (0.05)	14.85
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	13.19

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.403	95% Adjusted Gamma UCL	0.453

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.169	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-2.761	Mean of logged Data	-1.714
Maximum of Logged Data	-0.358	SD of logged Data	0.749

Assuming Lognormal Distribution

95% H-UCL	0.489	90% Chebyshev (MVUE) UCL	0.406
95% Chebyshev (MVUE) UCL	0.487	97.5% Chebyshev (MVUE) UCL	0.598
99% Chebyshev (MVUE) UCL	0.816		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.349	95% BCA Bootstrap UCL	0.39
95% Standard Bootstrap UCL	0.342	95% Bootstrap-t UCL	0.584
95% Hall's Bootstrap UCL	0.966	95% Percentile Bootstrap UCL	0.349
90% Chebyshev(Mean, Sd) UCL	0.442	95% Chebyshev(Mean, Sd) UCL	0.535
97.5% Chebyshev(Mean, Sd) UCL	0.664	99% Chebyshev(Mean, Sd) UCL	0.917

Suggested UCL to Use

95% Student's-t UCL	0.363

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C2-Phenanthrenes/Anthracenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0532	Mean	0.103
Maximum	0.216	Median	0.0835
SD	0.0498	Std. Error of Mean	0.0166
Coefficient of Variation	0.486	Skewness	1.675

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.836	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.133	95% Adjusted-CLT UCL (Chen-1995)	0.14
		95% Modified-t UCL (Johnson-1978)	0.135

Gamma GOF Test

A-D Test Statistic	0.389	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.191	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	5.958	k star (bias corrected MLE)	4.046
Theta hat (MLE)	0.0172	Theta star (bias corrected MLE)	0.0254
nu hat (MLE)	107.2	nu star (bias corrected)	72.83
MLE Mean (bias corrected)	0.103	MLE Sd (bias corrected)	0.051
		Approximate Chi Square Value (0.05)	54.18
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	50.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.138	95% Adjusted Gamma UCL	0.147

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.167	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level
Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-2.934	Mean of logged Data	-2.363
Maximum of Logged Data	-1.535	SD of logged Data	0.423

Assuming Lognormal Distribution

95% H-UCL	0.142	90% Chebyshev (MVUE) UCL	0.145
95% Chebyshev (MVUE) UCL	0.165	97.5% Chebyshev (MVUE) UCL	0.192
99% Chebyshev (MVUE) UCL	0.246		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.13	95% BCA Bootstrap UCL	0.139
95% Standard Bootstrap UCL	0.128	95% Bootstrap-t UCL	0.16
95% Hall's Bootstrap UCL	0.26	95% Percentile Bootstrap UCL	0.13
90% Chebyshev(Mean, Sd) UCL	0.152	95% Chebyshev(Mean, Sd) UCL	0.175
97.5% Chebyshev(Mean, Sd) UCL	0.206	99% Chebyshev(Mean, Sd) UCL	0.268

Suggested UCL to Use

95% Student's-t UCL	0.133

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C30-Hopane

General Statistics

Total Number of Observations	9	Number of Distinct Observations	5
		Number of Missing Observations	393
Number of Detects	3	Number of Non-Detects	6
Number of Distinct Detects	3	Number of Distinct Non-Detects	2
Minimum Detect	0.165	Minimum Non-Detect	0.00819
Maximum Detect	0.219	Maximum Non-Detect	0.00819
Variance Detects	7.1176E-4	Percent Non-Detects	66.67%
Mean Detects	0.193	SD Detects	0.0267
Median Detects	0.194	CV Detects	0.138
Skewness Detects	-0.224	Kurtosis Detects	N/A
Mean of Logged Detects	-1.653	SD of Logged Detects	0.14

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.998	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0697	KM Standard Error of Mean	0.0359
90KM SD	0.0879	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.136	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.129	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.177	95% KM Chebyshev UCL	0.226
97.5% KM Chebyshev UCL	0.294	99% KM Chebyshev UCL	0.427

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.252	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.634	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.231	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	77.08	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0025	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	462.5	nu star (bias corrected)	N/A
Mean (detects)	0.193		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0476	Mean	0.124
Maximum	0.219	Median	0.111
SD	0.0581	CV	0.469
k hat (MLE)	4.901	k star (bias corrected MLE)	3.342
Theta hat (MLE)	0.0253	Theta star (bias corrected MLE)	0.0371
nu hat (MLE)	88.22	nu star (bias corrected)	60.15
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (60.15, α)	43.31	Adjusted Chi Square Value (60.15, β)	40.32
95% Gamma Approximate UCL	0.172	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0697	SD (KM)	0.0879
Variance (KM)	0.00772	SE of Mean (KM)	0.0359
k hat (KM)	0.629	k star (KM)	0.493
nu hat (KM)	11.32	nu star (KM)	8.88
theta hat (KM)	0.111	theta star (KM)	0.141
80% gamma percentile (KM)	0.114	90% gamma percentile (KM)	0.189
95% gamma percentile (KM)	0.269	99% gamma percentile (KM)	0.466

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (8.88, α)	3.255	Adjusted Chi Square Value (8.88, β)	2.579
95% KM Approximate Gamma UCL	0.19	95% KM Adjusted Gamma UCL	0.24

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.993	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.205	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.137	Mean in Log Scale	-2.035

SD in Original Scale	0.0461	SD in Log Scale	0.324
95% t UCL (assumes normality of ROS data)	0.166	95% Percentile Bootstrap UCL	0.163
95% BCA Bootstrap UCL	0.165	95% Bootstrap t UCL	0.175
95% H-UCL (Log ROS)	0.174		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.754	KM Geo Mean	0.0234
KM SD (logged)	1.487	95% Critical H Value (KM-Log)	4.41
KM Standard Error of Mean (logged)	0.607	95% H-UCL (KM -Log)	0.719
KM SD (logged)	1.487	95% Critical H Value (KM-Log)	4.41
KM Standard Error of Mean (logged)	0.607		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0669	Mean in Log Scale	-4.216
SD in Original Scale	0.0952	SD in Log Scale	1.923
95% t UCL (Assumes normality)	0.126	95% H-Stat UCL	3.977

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.136

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C3-Benzothiophenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	3
		Number of Missing Observations	393
Number of Detects	1	Number of Non-Detects	8
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable C3-Benzothiophenes was not processed!

C3-Chrysenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	3
		Number of Missing Observations	393
Number of Detects	1	Number of Non-Detects	8
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable C3-Chrysenes was not processed!

C3-Decalins

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.483	Mean	0.792
Maximum	1.751	Median	0.608
SD	0.415	Std. Error of Mean	0.138
Coefficient of Variation	0.524	Skewness	1.828

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.754	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.307	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.05	95% Adjusted-CLT UCL (Chen-1995)	1.11
		95% Modified-t UCL (Johnson-1978)	1.064

Gamma GOF Test

A-D Test Statistic	0.77	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.723	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.293	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.28	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.437	k star (bias corrected MLE)	3.699
Theta hat (MLE)	0.146	Theta star (bias corrected MLE)	0.214
nu hat (MLE)	97.87	nu star (bias corrected)	66.58
MLE Mean (bias corrected)	0.792	MLE Sd (bias corrected)	0.412
		Approximate Chi Square Value (0.05)	48.8
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	45.61

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.081	95% Adjusted Gamma UCL	1.157

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.844	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.269	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.727	Mean of logged Data	-0.327
Maximum of Logged Data	0.56	SD of logged Data	0.435

Assuming Lognormal Distribution

95% H-UCL	1.106	90% Chebyshev (MVUE) UCL	1.128
95% Chebyshev (MVUE) UCL	1.284	97.5% Chebyshev (MVUE) UCL	1.5
99% Chebyshev (MVUE) UCL	1.925		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.02	95% BCA Bootstrap UCL	1.091
95% Standard Bootstrap UCL	1.004	95% Bootstrap-t UCL	1.276
95% Hall's Bootstrap UCL	1.143	95% Percentile Bootstrap UCL	1.021
90% Chebyshev(Mean, Sd) UCL	1.208	95% Chebyshev(Mean, Sd) UCL	1.396
97.5% Chebyshev(Mean, Sd) UCL	1.657	99% Chebyshev(Mean, Sd) UCL	2.169

Suggested UCL to Use

95% Student's-t UCL	1.05

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C3-Dibenzothiophenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	7
		Number of Missing Observations	393
Number of Detects	5	Number of Non-Detects	4
Number of Distinct Detects	5	Number of Distinct Non-Detects	2
Minimum Detect	0.0447	Minimum Non-Detect	0.00134
Maximum Detect	0.101	Maximum Non-Detect	0.00134
Variance Detects	4.4020E-4	Percent Non-Detects	44.44%
Mean Detects	0.0667	SD Detects	0.021
Median Detects	0.0625	CV Detects	0.314
Skewness Detects	1.392	Kurtosis Detects	2.922
Mean of Logged Detects	-2.743	SD of Logged Detects	0.294

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.867	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.327	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0377	KM Standard Error of Mean	0.0132
90KM SD	0.0354	95% KM (BCA) UCL	0.0564
95% KM (t) UCL	0.0622	95% KM (Percentile Bootstrap) UCL	0.0574
95% KM (z) UCL	0.0593	95% KM Bootstrap t UCL	0.0509
90% KM Chebyshev UCL	0.0772	95% KM Chebyshev UCL	0.0951
97.5% KM Chebyshev UCL	0.12	99% KM Chebyshev UCL	0.169

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.4	**Anderson-Darling GOF Test**

5% A-D Critical Value	0.679	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.296	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.357	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	14.03	k star (bias corrected MLE)	5.747
Theta hat (MLE)	0.00475	Theta star (bias corrected MLE)	0.0116
nu hat (MLE)	140.3	nu star (bias corrected)	57.47
Mean (detects)	0.0667		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0446
Maximum	0.101	Median	0.0447
SD	0.0305	CV	0.683
k hat (MLE)	2.121	k star (bias corrected MLE)	1.488
Theta hat (MLE)	0.021	Theta star (bias corrected MLE)	0.03
nu hat (MLE)	38.17	nu star (bias corrected)	26.78
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (26.78, α)	15.98	Adjusted Chi Square Value (26.78, β)	14.25
95% Gamma Approximate UCL	0.0747	95% Gamma Adjusted UCL	0.0837

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0377	SD (KM)	0.0354
Variance (KM)	0.00125	SE of Mean (KM)	0.0132
k hat (KM)	1.134	k star (KM)	0.83
nu hat (KM)	20.41	nu star (KM)	14.94
theta hat (KM)	0.0332	theta star (KM)	0.0454
80% gamma percentile (KM)	0.0614	90% gamma percentile (KM)	0.0908
95% gamma percentile (KM)	0.121	99% gamma percentile (KM)	0.191

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (14.94, α)	7.219	Adjusted Chi Square Value (14.94, β)	6.123
95% KM Approximate Gamma UCL	0.0779	95% KM Adjusted Gamma UCL	0.0919

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.28	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0496	Mean in Log Scale	-3.115
SD in Original Scale	0.0253	SD in Log Scale	0.5
95% t UCL (assumes normality of ROS data)	0.0653	95% Percentile Bootstrap UCL	0.0635
95% BCA Bootstrap UCL	0.0651	95% Bootstrap t UCL	0.0696
95% H-UCL (Log ROS)	0.0746		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.464	KM Geo Mean	0.0115
KM SD (logged)	1.934	95% Critical H Value (KM-Log)	5.537
KM Standard Error of Mean (logged)	0.721	95% H-UCL (KM -Log)	3.292

KM SD (logged)	1.934	95% Critical H Value (KM-Log)	5.537
KM Standard Error of Mean (logged)	0.721		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0374	Mean in Log Scale	-4.772
SD in Original Scale	0.0378	SD in Log Scale	2.415
95% t UCL (Assumes normality)	0.0608	95% H-Stat UCL	51.72

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0622

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C3-Fluoranthenes/Pyrenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.00902	Minimum Non-Detect	0.00247
Maximum Detect	0.027	Maximum Non-Detect	0.00247
Variance Detects	3.6970E-5	Percent Non-Detects	11.11%
Mean Detects	0.0166	SD Detects	0.00608
Median Detects	0.0147	CV Detects	0.367
Skewness Detects	0.642	Kurtosis Detects	-0.633
Mean of Logged Detects	-4.157	SD of Logged Detects	0.365

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.749	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.21	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.333	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.015	KM Standard Error of Mean	0.00248
90KM SD	0.00696	95% KM (BCA) UCL	0.0186
95% KM (t) UCL	0.0196	95% KM (Percentile Bootstrap) UCL	0.0188
95% KM (z) UCL	0.0191	95% KM Bootstrap t UCL	0.0197
90% KM Chebyshev UCL	0.0225	95% KM Chebyshev UCL	0.0258
97.5% KM Chebyshev UCL	0.0305	99% KM Chebyshev UCL	0.0397

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.256	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.716	Detected data appear Gamma Distributed at 5% Significance Level

K-S Test Statistic	0.176	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	8.77	k star (bias corrected MLE)	5.565
Theta hat (MLE)	0.00189	Theta star (bias corrected MLE)	0.00298
nu hat (MLE)	140.3	nu star (bias corrected)	89.03
Mean (detects)	0.0166		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00902	Mean	0.0159
Maximum	0.027	Median	0.0141
SD	0.0061	CV	0.385
k hat (MLE)	8.134	k star (bias corrected MLE)	5.496
Theta hat (MLE)	0.00195	Theta star (bias corrected MLE)	0.00288
nu hat (MLE)	146.4	nu star (bias corrected)	98.94
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (98.94, α)	76.99	Adjusted Chi Square Value (98.94, β)	72.92
95% Gamma Approximate UCL	0.0204	95% Gamma Adjusted UCL	0.0215

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.015	SD (KM)	0.00696
Variance (KM)	4.8435E-5	SE of Mean (KM)	0.00248
k hat (KM)	4.655	k star (KM)	3.178
nu hat (KM)	83.8	nu star (KM)	57.2
theta hat (KM)	0.00323	theta star (KM)	0.00473
80% gamma percentile (KM)	0.0213	90% gamma percentile (KM)	0.0263
95% gamma percentile (KM)	0.031	99% gamma percentile (KM)	0.0411

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (57.20, α)	40.81	Adjusted Chi Square Value (57.20, β)	37.91
95% KM Approximate Gamma UCL	0.021	95% KM Adjusted Gamma UCL	0.0227

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.967	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.851	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.152	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0154	Mean in Log Scale	-4.258
SD in Original Scale	0.00664	SD in Log Scale	0.456
95% t UCL (assumes normality of ROS data)	0.0196	95% Percentile Bootstrap UCL	0.019
95% BCA Bootstrap UCL	0.0191	95% Bootstrap t UCL	0.0202
95% H-UCL (Log ROS)	0.0223		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.363	KM Geo Mean	0.0127
KM SD (logged)	0.663	95% Critical H Value (KM-Log)	2.556
KM Standard Error of Mean (logged)	0.236	95% H-UCL (KM -Log)	0.0289
KM SD (logged)	0.663	95% Critical H Value (KM-Log)	2.556

KM Standard Error of Mean (logged)	0.236

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0149	Mean in Log Scale	-4.44
SD in Original Scale	0.00765	SD in Log Scale	0.913
95% t UCL (Assumes normality)	0.0196	95% H-Stat UCL	0.0479

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0196

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C3-Fluorenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	6
		Number of Missing Observations	393
Number of Detects	4	Number of Non-Detects	5
Number of Distinct Detects	4	Number of Distinct Non-Detects	2
Minimum Detect	0.0787	Minimum Non-Detect	0.00163
Maximum Detect	0.301	Maximum Non-Detect	0.00163
Variance Detects	0.0108	Percent Non-Detects	55.56%
Mean Detects	0.194	SD Detects	0.104
Median Detects	0.199	CV Detects	0.534
Skewness Detects	-0.134	Kurtosis Detects	-3.782
Mean of Logged Detects	-1.769	SD of Logged Detects	0.618

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.687	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.236	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.413	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0873	KM Standard Error of Mean	0.0435
90KM SD	0.113	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.168	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.159	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.218	95% KM Chebyshev UCL	0.277
97.5% KM Chebyshev UCL	0.359	99% KM Chebyshev UCL	0.52

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.316	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.659	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.28	**Kolmogorov-Smirnov GOF**

5% K-S Critical Value	0.396	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	3.996	k star (bias corrected MLE)	1.166
Theta hat (MLE)	0.0486	Theta star (bias corrected MLE)	0.167
nu hat (MLE)	31.97	nu star (bias corrected)	9.326
Mean (detects)	0.194		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0919
Maximum	0.301	Median	0.01
SD	0.116	CV	1.263
k hat (MLE)	0.639	k star (bias corrected MLE)	0.5
Theta hat (MLE)	0.144	Theta star (bias corrected MLE)	0.184
nu hat (MLE)	11.51	nu star (bias corrected)	9.005
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (9.00, α)	3.33	Adjusted Chi Square Value (9.00, β)	2.644
95% Gamma Approximate UCL	0.249	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0873	SD (KM)	0.113
Variance (KM)	0.0128	SE of Mean (KM)	0.0435
k hat (KM)	0.597	k star (KM)	0.472
nu hat (KM)	10.74	nu star (KM)	8.494
theta hat (KM)	0.146	theta star (KM)	0.185
80% gamma percentile (KM)	0.143	90% gamma percentile (KM)	0.239
95% gamma percentile (KM)	0.342	99% gamma percentile (KM)	0.598

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (8.49, α)	3.025	Adjusted Chi Square Value (8.49, β)	2.379
95% KM Approximate Gamma UCL	0.245	95% KM Adjusted Gamma UCL	0.312

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.925	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.792	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.252	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.346	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.101	Mean in Log Scale	-2.881
SD in Original Scale	0.11	SD in Log Scale	1.189
95% t UCL (assumes normality of ROS data)	0.169	95% Percentile Bootstrap UCL	0.162
95% BCA Bootstrap UCL	0.171	95% Bootstrap t UCL	0.24
95% H-UCL (Log ROS)	0.532		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.353	KM Geo Mean	0.0129
KM SD (logged)	2.339	95% Critical H Value (KM-Log)	6.597
KM Standard Error of Mean (logged)	0.9	95% H-UCL (KM -Log)	46.48
KM SD (logged)	2.339	95% Critical H Value (KM-Log)	6.597
KM Standard Error of Mean (logged)	0.9		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0868	Mean in Log Scale	-4.738
SD in Original Scale	0.12	SD in Log Scale	2.842
95% t UCL (Assumes normality)	0.161	95% H-Stat UCL	1432

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.168

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C3-Naphthalenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.165	Mean	0.316
Maximum	0.514	Median	0.339
SD	0.111	Std. Error of Mean	0.037
Coefficient of Variation	0.351	Skewness	0.209

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.136	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.385	95% Adjusted-CLT UCL (Chen-1995)	0.38
		95% Modified-t UCL (Johnson-1978)	0.385

Gamma GOF Test

A-D Test Statistic	0.316	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.18	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	8.513	k star (bias corrected MLE)	5.75
Theta hat (MLE)	0.0371	Theta star (bias corrected MLE)	0.055
nu hat (MLE)	153.2	nu star (bias corrected)	103.5

MLE Mean (bias corrected)	0.316	MLE Sd (bias corrected)	0.132
		Approximate Chi Square Value (0.05)	81.02
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	76.83

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.404	95% Adjusted Gamma UCL	0.426

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.191	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-1.804	Mean of logged Data	-1.212
Maximum of Logged Data	-0.665	SD of logged Data	0.377

Assuming Lognormal Distribution

95% H-UCL	0.423	90% Chebyshev (MVUE) UCL	0.438
95% Chebyshev (MVUE) UCL	0.492	97.5% Chebyshev (MVUE) UCL	0.568
99% Chebyshev (MVUE) UCL	0.717		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.377	95% BCA Bootstrap UCL	0.373
95% Standard Bootstrap UCL	0.373	95% Bootstrap-t UCL	0.384
95% Hall's Bootstrap UCL	0.385	95% Percentile Bootstrap UCL	0.374
90% Chebyshev(Mean, Sd) UCL	0.427	95% Chebyshev(Mean, Sd) UCL	0.477
97.5% Chebyshev(Mean, Sd) UCL	0.547	99% Chebyshev(Mean, Sd) UCL	0.684

Suggested UCL to Use

95% Student's-t UCL	0.385

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C3-Naphthobenzothiophenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	3
		Number of Missing Observations	393
Number of Detects	1	Number of Non-Detects	8
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable C3-Naphthobenzothiophenes was not processed!

C3-Phenanthrenes/Anthracenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9

		Number of Missing Observations	393
Minimum	0.0324	Mean	0.068
Maximum	0.109	Median	0.0632
SD	0.0249	Std. Error of Mean	0.00829
Coefficient of Variation	0.365	Skewness	0.292

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.977	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.133	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0834	95% Adjusted-CLT UCL (Chen-1995)	0.0825
		95% Modified-t UCL (Johnson-1978)	0.0836

Gamma GOF Test

A-D Test Statistic	0.155	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.119	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	8.018	k star (bias corrected MLE)	5.419
Theta hat (MLE)	0.00849	Theta star (bias corrected MLE)	0.0126
nu hat (MLE)	144.3	nu star (bias corrected)	97.55
MLE Mean (bias corrected)	0.068	MLE Sd (bias corrected)	0.0292
		Approximate Chi Square Value (0.05)	75.76
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	71.72

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0876	95% Adjusted Gamma UCL	0.0925

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.976	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.139	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-3.428	Mean of logged Data	-2.751
Maximum of Logged Data	-2.212	SD of logged Data	0.388

Assuming Lognormal Distribution

95% H-UCL	0.092	90% Chebyshev (MVUE) UCL	0.0949
95% Chebyshev (MVUE) UCL	0.107	97.5% Chebyshev (MVUE) UCL	0.124
99% Chebyshev (MVUE) UCL	0.157		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0817	95% BCA Bootstrap UCL	0.0818
95% Standard Bootstrap UCL	0.0806	95% Bootstrap-t UCL	0.0843
95% Hall's Bootstrap UCL	0.0831	95% Percentile Bootstrap UCL	0.0808
90% Chebyshev(Mean, Sd) UCL	0.0929	95% Chebyshev(Mean, Sd) UCL	0.104
97.5% Chebyshev(Mean, Sd) UCL	0.12	99% Chebyshev(Mean, Sd) UCL	0.15

Suggested UCL to Use

95% Student's-t UCL	0.0834

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C4-Chrysenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	3
		Number of Missing Observations	393
Number of Detects	1	Number of Non-Detects	8
Number of Distinct Detects	1	Number of Distinct Non-Detects	2

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable C4-Chrysenes was not processed!

C4-Decalins

General Statistics

Total Number of Observations	9	Number of Distinct Observations	8
		Number of Missing Observations	393
Number of Detects	7	Number of Non-Detects	2
Number of Distinct Detects	7	Number of Distinct Non-Detects	1
Minimum Detect	0.33	Minimum Non-Detect	0.00228
Maximum Detect	0.756	Maximum Non-Detect	0.00228
Variance Detects	0.0256	Percent Non-Detects	22.22%
Mean Detects	0.506	SD Detects	0.16
Median Detects	0.467	CV Detects	0.316
Skewness Detects	0.692	Kurtosis Detects	-0.814
Mean of Logged Detects	-0.723	SD of Logged Detects	0.309

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.912	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.214	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.394	KM Standard Error of Mean	0.0888
90KM SD	0.247	95% KM (BCA) UCL	0.534
95% KM (t) UCL	0.559	95% KM (Percentile Bootstrap) UCL	0.532
95% KM (z) UCL	0.54	95% KM Bootstrap t UCL	0.532
90% KM Chebyshev UCL	0.661	95% KM Chebyshev UCL	0.781
97.5% KM Chebyshev UCL	0.949	99% KM Chebyshev UCL	1.278

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.297	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.708	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.176	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.312	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	12.23	k star (bias corrected MLE)	7.082
Theta hat (MLE)	0.0414	Theta star (bias corrected MLE)	0.0714
nu hat (MLE)	171.2	nu star (bias corrected)	99.15
Mean (detects)	0.506		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.123	Mean	0.429
Maximum	0.756	Median	0.443
SD	0.207	CV	0.483
k hat (MLE)	4.017	k star (bias corrected MLE)	2.752
Theta hat (MLE)	0.107	Theta star (bias corrected MLE)	0.156
nu hat (MLE)	72.3	nu star (bias corrected)	49.53
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (49.53, α)	34.37	Adjusted Chi Square Value (49.53, β)	31.73
95% Gamma Approximate UCL	0.618	95% Gamma Adjusted UCL	0.67

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.394	SD (KM)	0.247
Variance (KM)	0.0609	SE of Mean (KM)	0.0888
k hat (KM)	2.549	k star (KM)	1.774
nu hat (KM)	45.89	nu star (KM)	31.93
theta hat (KM)	0.155	theta star (KM)	0.222
80% gamma percentile (KM)	0.598	90% gamma percentile (KM)	0.788
95% gamma percentile (KM)	0.971	99% gamma percentile (KM)	1.38

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (31.93, α)	20.01	Adjusted Chi Square Value (31.93, β)	18.05
95% KM Approximate Gamma UCL	0.629	95% KM Adjusted Gamma UCL	0.697

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.161	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.443	Mean in Log Scale	-0.896
SD in Original Scale	0.186	SD in Log Scale	0.438
95% t UCL (assumes normality of ROS data)	0.559	95% Percentile Bootstrap UCL	0.544
95% BCA Bootstrap UCL	0.546	95% Bootstrap t UCL	0.583
95% H-UCL (Log ROS)	0.629		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.914	KM Geo Mean	0.148
KM SD (logged)	2.242	95% Critical H Value (KM-Log)	6.342
KM Standard Error of Mean (logged)	0.807	95% H-UCL (KM -Log)	278
KM SD (logged)	2.242	95% Critical H Value (KM-Log)	6.342
KM Standard Error of Mean (logged)	0.807		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.394	Mean in Log Scale	-2.068
SD in Original Scale	0.262	SD in Log Scale	2.682
95% t UCL (Assumes normality)	0.556	95% H-Stat UCL	5681

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.559

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C4-Dibenzothiophenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	6
		Number of Missing Observations	393
Number of Detects	4	Number of Non-Detects	5
Number of Distinct Detects	4	Number of Distinct Non-Detects	2
Minimum Detect	0.0392	Minimum Non-Detect	0.00134
Maximum Detect	0.0474	Maximum Non-Detect	0.00134
Variance Detects	1.4123E-5	Percent Non-Detects	55.56%
Mean Detects	0.0437	SD Detects	0.00376
Median Detects	0.044	CV Detects	0.0861
Skewness Detects	-0.322	Kurtosis Detects	-3.037
Mean of Logged Detects	-3.134	SD of Logged Detects	0.0869

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.941	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.687	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.237	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.413	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0201	KM Standard Error of Mean	0.00814
90KM SD	0.0211	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0353	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0335	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0446	95% KM Chebyshev UCL	0.0556
97.5% KM Chebyshev UCL	0.071	99% KM Chebyshev UCL	0.101

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.3	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.657	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.271	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.394	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	177.8	k star (bias corrected MLE)	44.62
Theta hat (MLE)	2.4557E-4	Theta star (bias corrected MLE)	9.7862E-4
nu hat (MLE)	1422	nu star (bias corrected)	356.9
Mean (detects)	0.0437		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0281	Mean	0.0371
Maximum	0.0474	Median	0.0351
SD	0.00699	CV	0.189
k hat (MLE)	31.9	k star (bias corrected MLE)	21.34
Theta hat (MLE)	0.00116	Theta star (bias corrected MLE)	0.00174
nu hat (MLE)	574.2	nu star (bias corrected)	384.2
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (384.16, α)	339.7	Adjusted Chi Square Value (384.16, β)	330.9
95% Gamma Approximate UCL	0.0419	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0201	SD (KM)	0.0211
Variance (KM)	4.4696E-4	SE of Mean (KM)	0.00814
k hat (KM)	0.908	k star (KM)	0.68
nu hat (KM)	16.35	nu star (KM)	12.23
theta hat (KM)	0.0222	theta star (KM)	0.0296
80% gamma percentile (KM)	0.0332	90% gamma percentile (KM)	0.0509
95% gamma percentile (KM)	0.0693	99% gamma percentile (KM)	0.113

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (12.23, α)	5.381	Adjusted Chi Square Value (12.23, β)	4.461
95% KM Approximate Gamma UCL	0.0458	95% KM Adjusted Gamma UCL	0.0553

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.792	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.24	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.346	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0376	Mean in Log Scale	-3.292
SD in Original Scale	0.00639	SD in Log Scale	0.168
95% t UCL (assumes normality of ROS data)	0.0416	95% Percentile Bootstrap UCL	0.0411
95% BCA Bootstrap UCL	0.0412	95% Bootstrap t UCL	0.0421
95% H-UCL (Log ROS)	0.0421		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.068	KM Geo Mean	0.0063
KM SD (logged)	1.73	95% Critical H Value (KM-Log)	5.016
KM Standard Error of Mean (logged)	0.666	95% H-UCL (KM -Log)	0.606
KM SD (logged)	1.73	95% Critical H Value (KM-Log)	5.016
KM Standard Error of Mean (logged)	0.666		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0198	Mean in Log Scale	-5.453
SD in Original Scale	0.0228	SD in Log Scale	2.201
95% t UCL (Assumes normality)	0.0339	95% H-Stat UCL	6.156

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0353

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C4-Naphthalenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.136	Minimum Non-Detect	0.00582
Maximum Detect	0.189	Maximum Non-Detect	0.00582
Variance Detects	4.2552E-4	Percent Non-Detects	11.11%
Mean Detects	0.167	SD Detects	0.0206
Median Detects	0.168	CV Detects	0.124
Skewness Detects	-0.215	Kurtosis Detects	-1.82
Mean of Logged Detects	-1.799	SD of Logged Detects	0.126

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.88	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.749	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.244	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.333	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.149	KM Standard Error of Mean	0.0191
90KM SD	0.0537	95% KM (BCA) UCL	0.173
95% KM (t) UCL	0.184	95% KM (Percentile Bootstrap) UCL	0.174
95% KM (z) UCL	0.18	95% KM Bootstrap t UCL	0.173
90% KM Chebyshev UCL	0.206	95% KM Chebyshev UCL	0.232
97.5% KM Chebyshev UCL	0.268	99% KM Chebyshev UCL	0.339

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.537	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.715	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.263	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.293	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	72.96	k star (bias corrected MLE)	45.68
Theta hat (MLE)	0.00228	Theta star (bias corrected MLE)	0.00365
nu hat (MLE)	1167	nu star (bias corrected)	730.9
Mean (detects)	0.167		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.121	Mean	0.161
Maximum	0.189	Median	0.155
SD	0.0247	CV	0.153
k hat (MLE)	46.19	k star (bias corrected MLE)	30.87
Theta hat (MLE)	0.0035	Theta star (bias corrected MLE)	0.00523
nu hat (MLE)	831.4	nu star (bias corrected)	555.6
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (555.62, α)	502	Adjusted Chi Square Value (555.62, β)	491.2
95% Gamma Approximate UCL	0.179	95% Gamma Adjusted UCL	0.183

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.149	SD (KM)	0.0537
Variance (KM)	0.00288	SE of Mean (KM)	0.0191
k hat (KM)	7.67	k star (KM)	5.187
nu hat (KM)	138.1	nu star (KM)	93.37
theta hat (KM)	0.0194	theta star (KM)	0.0287
80% gamma percentile (KM)	0.199	90% gamma percentile (KM)	0.236
95% gamma percentile (KM)	0.27	99% gamma percentile (KM)	0.341

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (93.37, α)	72.09	Adjusted Chi Square Value (93.37, β)	68.15
95% KM Approximate Gamma UCL	0.193	95% KM Adjusted Gamma UCL	0.204

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.882	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.851	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.162	Mean in Log Scale	-1.833

SD in Original Scale	0.0243	SD in Log Scale	0.155
95% t UCL (assumes normality of ROS data)	0.177	95% Percentile Bootstrap UCL	0.174
95% BCA Bootstrap UCL	0.173	95% Bootstrap t UCL	0.176
95% H-UCL (Log ROS)	0.179		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.171	KM Geo Mean	0.114
KM SD (logged)	1.058	95% Critical H Value (KM-Log)	3.369
KM Standard Error of Mean (logged)	0.377	95% H-UCL (KM -Log)	0.704
KM SD (logged)	1.058	95% Critical H Value (KM-Log)	3.369
KM Standard Error of Mean (logged)	0.377		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.148	Mean in Log Scale	-2.248
SD in Original Scale	0.0579	SD in Log Scale	1.352
95% t UCL (Assumes normality)	0.184	95% H-Stat UCL	1.844

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.184

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

C4-Phenanthrenes/Anthracenes

General Statistics

Total Number of Observations	9	Number of Distinct Observations	8
		Number of Missing Observations	393
Number of Detects	6	Number of Non-Detects	3
Number of Distinct Detects	6	Number of Distinct Non-Detects	2
Minimum Detect	0.0224	Minimum Non-Detect	0.00303
Maximum Detect	0.0512	Maximum Non-Detect	0.00303
Variance Detects	1.0352E-4	Percent Non-Detects	33.33%
Mean Detects	0.0356	SD Detects	0.0102
Median Detects	0.0353	CV Detects	0.285
Skewness Detects	0.342	Kurtosis Detects	-0.219
Mean of Logged Detects	-3.369	SD of Logged Detects	0.292

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.988	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.713	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.123	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.373	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0248	KM Standard Error of Mean	0.00626

90KM SD	0.0171	95% KM (BCA) UCL	0.034
95% KM (t) UCL	0.0364	95% KM (Percentile Bootstrap) UCL	0.034
95% KM (z) UCL	0.0351	95% KM Bootstrap t UCL	0.033
90% KM Chebyshev UCL	0.0436	95% KM Chebyshev UCL	0.0521
97.5% KM Chebyshev UCL	0.0639	99% KM Chebyshev UCL	0.0871

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.148	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.698	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.138	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.332	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	14.53	k star (bias corrected MLE)	7.374
Theta hat (MLE)	0.00245	Theta star (bias corrected MLE)	0.00483
nu hat (MLE)	174.3	nu star (bias corrected)	88.49
Mean (detects)	0.0356		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0278
Maximum	0.0512	Median	0.0283
SD	0.0143	CV	0.513
k hat (MLE)	3.798	k star (bias corrected MLE)	2.606
Theta hat (MLE)	0.00733	Theta star (bias corrected MLE)	0.0107
nu hat (MLE)	68.36	nu star (bias corrected)	46.91
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (46.91, α)	32.19	Adjusted Chi Square Value (46.91, β)	29.64
95% Gamma Approximate UCL	0.0406	95% Gamma Adjusted UCL	0.044

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0248	SD (KM)	0.0171
Variance (KM)	2.9396E-4	SE of Mean (KM)	0.00626
k hat (KM)	2.088	k star (KM)	1.466
nu hat (KM)	37.59	nu star (KM)	26.39
theta hat (KM)	0.0119	theta star (KM)	0.0169
80% gamma percentile (KM)	0.0384	90% gamma percentile (KM)	0.0519
95% gamma percentile (KM)	0.065	99% gamma percentile (KM)	0.0947

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (26.39, α)	15.68	Adjusted Chi Square Value (26.39, β)	13.97
95% KM Approximate Gamma UCL	0.0417	95% KM Adjusted Gamma UCL	0.0468

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.993	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.826	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.139	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.298	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0291	Mean in Log Scale	-3.627
SD in Original Scale	0.0127	SD in Log Scale	0.454

95% t UCL (assumes normality of ROS data)	0.037	95% Percentile Bootstrap UCL	0.0358
95% BCA Bootstrap UCL	0.036	95% Bootstrap t UCL	0.038
95% H-UCL (Log ROS)	0.0419		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.179	KM Geo Mean	0.0153
KM SD (logged)	1.166	95% Critical H Value (KM-Log)	3.619
KM Standard Error of Mean (logged)	0.426	95% H-UCL (KM -Log)	0.134
KM SD (logged)	1.166	95% Critical H Value (KM-Log)	3.619
KM Standard Error of Mean (logged)	0.426		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0243	Mean in Log Scale	-4.41
SD in Original Scale	0.0189	SD in Log Scale	1.579
95% t UCL (Assumes normality)	0.036	95% H-Stat UCL	0.563

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0364

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Cadmium

General Statistics

Total Number of Observations	62	Number of Distinct Observations	57
		Number of Missing Observations	361
Minimum	0.081	Mean	0.192
Maximum	0.309	Median	0.195
SD	0.0404	Std. Error of Mean	0.00513
Coefficient of Variation	0.211	Skewness	-0.0366

Normal GOF Test

Shapiro Wilk Test Statistic	0.986	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	0.885	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.082	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.13	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.2	95% Adjusted-CLT UCL (Chen-1995)	0.2
		95% Modified-t UCL (Johnson-1978)	0.2

Gamma GOF Test

A-D Test Statistic	0.835	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.749	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.11	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.113	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	20.9	k star (bias corrected MLE)	19.89

Theta hat (MLE)	0.00918	Theta star (bias corrected MLE)	0.00964
nu hat (MLE)	2591	nu star (bias corrected)	2467
MLE Mean (bias corrected)	0.192	MLE Sd (bias corrected)	0.043
		Approximate Chi Square Value (0.05)	2353
Adjusted Level of Significance	0.0461	Adjusted Chi Square Value	2350

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.201	95% Adjusted Gamma UCL	0.201

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.0155	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.126	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.103	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.513	Mean of logged Data	-1.676
Maximum of Logged Data	-1.174	SD of logged Data	0.229

Assuming Lognormal Distribution

95% H-UCL	0.202	90% Chebyshev (MVUE) UCL	0.209
95% Chebyshev (MVUE) UCL	0.217	97.5% Chebyshev (MVUE) UCL	0.227
99% Chebyshev (MVUE) UCL	0.248		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.2	95% BCA Bootstrap UCL	0.2
95% Standard Bootstrap UCL	0.2	95% Bootstrap-t UCL	0.2
95% Hall's Bootstrap UCL	0.2	95% Percentile Bootstrap UCL	0.2
90% Chebyshev(Mean, Sd) UCL	0.207	95% Chebyshev(Mean, Sd) UCL	0.214
97.5% Chebyshev(Mean, Sd) UCL	0.224	99% Chebyshev(Mean, Sd) UCL	0.243

Suggested UCL to Use

95% Student's-t UCL	0.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Carbazole

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0478	Mean	0.123
Maximum	0.201	Median	0.115
SD	0.0551	Std. Error of Mean	0.0184
Coefficient of Variation	0.449	Skewness	0.209

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance, but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7). The Chebyshev UCL often results in gross overestimates of the mean.

Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.189	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.157	95% Adjusted-CLT UCL (Chen-1995)	0.154
		95% Modified-t UCL (Johnson-1978)	0.157

Gamma GOF Test

A-D Test Statistic	0.284	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.154	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	5.061	k star (bias corrected MLE)	3.448
Theta hat (MLE)	0.0243	Theta star (bias corrected MLE)	0.0356
nu hat (MLE)	91.1	nu star (bias corrected)	62.07
MLE Mean (bias corrected)	0.123	MLE Sd (bias corrected)	0.0662
		Approximate Chi Square Value (0.05)	44.95
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	41.89

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.17	95% Adjusted Gamma UCL	0.182

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.172	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-3.04	Mean of logged Data	-2.199
Maximum of Logged Data	-1.602	SD of logged Data	0.499

Assuming Lognormal Distribution

95% H-UCL	0.186	90% Chebyshev (MVUE) UCL	0.186
95% Chebyshev (MVUE) UCL	0.215	97.5% Chebyshev (MVUE) UCL	0.254
99% Chebyshev (MVUE) UCL	0.331		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.153	95% BCA Bootstrap UCL	0.151
95% Standard Bootstrap UCL	0.151	95% Bootstrap-t UCL	0.161
95% Hall's Bootstrap UCL	0.155	95% Percentile Bootstrap UCL	0.151
90% Chebyshev(Mean, Sd) UCL	0.178	95% Chebyshev(Mean, Sd) UCL	0.203
97.5% Chebyshev(Mean, Sd) UCL	0.238	99% Chebyshev(Mean, Sd) UCL	0.306

Suggested UCL to Use

95% Student's-t UCL 0.157

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Carbon Disulfide

General Statistics

Total Number of Observations	14	Number of Distinct Observations	10
		Number of Missing Observations	364
Number of Detects	10	Number of Non-Detects	4
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	0.29	Minimum Non-Detect	0.032
Maximum Detect	0.7	Maximum Non-Detect	0.2
Variance Detects	0.0187	Percent Non-Detects	28.57%
Mean Detects	0.597	SD Detects	0.137
Median Detects	0.645	CV Detects	0.229
Skewness Detects	-1.662	Kurtosis Detects	2.052
Mean of Logged Detects	-0.548	SD of Logged Detects	0.286

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.759	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.781	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.28	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.304	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.436	KM Standard Error of Mean	0.0783
90KM SD	0.278	95% KM (BCA) UCL	0.568
95% KM (t) UCL	0.574	95% KM (Percentile Bootstrap) UCL	0.561
95% KM (z) UCL	0.564	95% KM Bootstrap t UCL	0.549
90% KM Chebyshev UCL	0.67	95% KM Chebyshev UCL	0.777
97.5% KM Chebyshev UCL	0.924	99% KM Chebyshev UCL	1.214

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.25	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.725	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.315	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.266	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	15.92	k star (bias corrected MLE)	11.21
Theta hat (MLE)	0.0375	Theta star (bias corrected MLE)	0.0532
nu hat (MLE)	318.5	nu star (bias corrected)	224.3
Mean (detects)	0.597		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.29	Mean	0.53
Maximum	0.7	Median	0.6
SD	0.159	CV	0.3

k hat (MLE)	10.8	k star (bias corrected MLE)	8.534
Theta hat (MLE)	0.0491	Theta star (bias corrected MLE)	0.0621
nu hat (MLE)	302.4	nu star (bias corrected)	238.9
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (238.95, α)	204.2	Adjusted Chi Square Value (238.95, β)	199.9
95% Gamma Approximate UCL	0.62	95% Gamma Adjusted UCL	0.634

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.436	SD (KM)	0.278
Variance (KM)	0.0772	SE of Mean (KM)	0.0783
k hat (KM)	2.459	k star (KM)	1.979
nu hat (KM)	68.84	nu star (KM)	55.43
theta hat (KM)	0.177	theta star (KM)	0.22
80% gamma percentile (KM)	0.653	90% gamma percentile (KM)	0.849
95% gamma percentile (KM)	1.037	99% gamma percentile (KM)	1.452

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (55.43, α)	39.32	Adjusted Chi Square Value (55.43, β)	37.52
95% KM Approximate Gamma UCL	0.614	95% KM Adjusted Gamma UCL	0.643

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.704	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.869	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.328	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.241	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.523	Mean in Log Scale	-0.702
SD in Original Scale	0.167	SD in Log Scale	0.351
95% t UCL (assumes normality of ROS data)	0.602	95% Percentile Bootstrap UCL	0.595
95% BCA Bootstrap UCL	0.587	95% Bootstrap t UCL	0.599
95% H-UCL (Log ROS)	0.636		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.375	KM Geo Mean	0.253
KM SD (logged)	1.328	95% Critical H Value (KM-Log)	3.367
KM Standard Error of Mean (logged)	0.374	95% H-UCL (KM -Log)	2.11
KM SD (logged)	1.328	95% Critical H Value (KM-Log)	3.367
KM Standard Error of Mean (logged)	0.374		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.443	Mean in Log Scale	-1.311
SD in Original Scale	0.278	SD in Log Scale	1.372
95% t UCL (Assumes normality)	0.575	95% H-Stat UCL	2.57

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.574

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chlorobenzene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	8
		Number of Missing Observations	409
Number of Detects	4	Number of Non-Detects	14
Number of Distinct Detects	4	Number of Distinct Non-Detects	5
Minimum Detect	0.03	Minimum Non-Detect	0.01
Maximum Detect	0.08	Maximum Non-Detect	0.8
Variance Detects	4.6667E-4	Percent Non-Detects	77.78%
Mean Detects	0.05	SD Detects	0.0216
Median Detects	0.045	CV Detects	0.432
Skewness Detects	1.19	Kurtosis Detects	1.5
Mean of Logged Detects	-3.062	SD of Logged Detects	0.414

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.687	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.25	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.413	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0293	KM Standard Error of Mean	0.00815
90KM SD	0.0191	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0435	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0427	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0537	95% KM Chebyshev UCL	0.0648
97.5% KM Chebyshev UCL	0.0802	99% KM Chebyshev UCL	0.11

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.246	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.658	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.202	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.395	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	7.74	k star (bias corrected MLE)	2.102
Theta hat (MLE)	0.00646	Theta star (bias corrected MLE)	0.0238
nu hat (MLE)	61.92	nu star (bias corrected)	16.81
Mean (detects)	0.05		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0269
Maximum	0.08	Median	0.0231
SD	0.0182	CV	0.678
k hat (MLE)	2.704	k star (bias corrected MLE)	2.291
Theta hat (MLE)	0.00994	Theta star (bias corrected MLE)	0.0117
nu hat (MLE)	97.36	nu star (bias corrected)	82.47
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (82.47, α)	62.54	Adjusted Chi Square Value (82.47, β)	60.87

95% Gamma Approximate UCL	0.0355	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0293	SD (KM)	0.0191
Variance (KM)	3.6378E-4	SE of Mean (KM)	0.00815
k hat (KM)	2.358	k star (KM)	2.002
nu hat (KM)	84.88	nu star (KM)	72.06
theta hat (KM)	0.0124	theta star (KM)	0.0146
80% gamma percentile (KM)	0.0438	90% gamma percentile (KM)	0.0569
95% gamma percentile (KM)	0.0694	99% gamma percentile (KM)	0.0972

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (72.06, α)	53.52	Adjusted Chi Square Value (72.06, β)	51.98
95% KM Approximate Gamma UCL	0.0394	95% KM Adjusted Gamma UCL	0.0406

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.984	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.792	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.346	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0301	Mean in Log Scale	-3.606
SD in Original Scale	0.0159	SD in Log Scale	0.453
95% t UCL (assumes normality of ROS data)	0.0367	95% Percentile Bootstrap UCL	0.037
95% BCA Bootstrap UCL	0.0384	95% Bootstrap t UCL	0.0398
95% H-UCL (Log ROS)	0.0374		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.751	KM Geo Mean	0.0235
KM SD (logged)	0.686	95% Critical H Value (KM-Log)	2.221
KM Standard Error of Mean (logged)	0.367	95% H-UCL (KM -Log)	0.043
KM SD (logged)	0.686	95% Critical H Value (KM-Log)	2.221
KM Standard Error of Mean (logged)	0.367		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0934	Mean in Log Scale	-3.192
SD in Original Scale	0.143	SD in Log Scale	1.221
95% t UCL (Assumes normality)	0.152	95% H-Stat UCL	0.209

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0435

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chloroethane

General Statistics

Total Number of Observations	18	Number of Distinct Observations	11
		Number of Missing Observations	409

Number of Detects	7	Number of Non-Detects	11
Number of Distinct Detects	7	Number of Distinct Non-Detects	4
Minimum Detect	0.17	Minimum Non-Detect	0.054
Maximum Detect	0.69	Maximum Non-Detect	2.6
Variance Detects	0.034	Percent Non-Detects	61.11%
Mean Detects	0.401	SD Detects	0.185
Median Detects	0.44	CV Detects	0.46
Skewness Detects	0.0834	Kurtosis Detects	-0.423
Mean of Logged Detects	-1.021	SD of Logged Detects	0.53

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.171	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.225	KM Standard Error of Mean	0.0599
90KM SD	0.21	95% KM (BCA) UCL	0.328
95% KM (t) UCL	0.329	95% KM (Percentile Bootstrap) UCL	0.326
95% KM (z) UCL	0.324	95% KM Bootstrap t UCL	0.328
90% KM Chebyshev UCL	0.405	95% KM Chebyshev UCL	0.486
97.5% KM Chebyshev UCL	0.599	99% KM Chebyshev UCL	0.821

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.404	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.71	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.21	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.313	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	4.758	k star (bias corrected MLE)	2.814
Theta hat (MLE)	0.0844	Theta star (bias corrected MLE)	0.143
nu hat (MLE)	66.61	nu star (bias corrected)	39.4
Mean (detects)	0.401		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.222
Maximum	0.69	Median	0.17
SD	0.2	CV	0.9
k hat (MLE)	0.962	k star (bias corrected MLE)	0.838
Theta hat (MLE)	0.231	Theta star (bias corrected MLE)	0.265
nu hat (MLE)	34.62	nu star (bias corrected)	30.18
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (30.18, α)	18.64	Adjusted Chi Square Value (30.18, β)	17.77
95% Gamma Approximate UCL	0.36	95% Gamma Adjusted UCL	0.378

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.225	SD (KM)	0.21
Variance (KM)	0.0439	SE of Mean (KM)	0.0599

k hat (KM)	1.157	k star (KM)	1.001
nu hat (KM)	41.65	nu star (KM)	36.04
theta hat (KM)	0.195	theta star (KM)	0.225
80% gamma percentile (KM)	0.363	90% gamma percentile (KM)	0.519
95% gamma percentile (KM)	0.675	99% gamma percentile (KM)	1.037

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (36.04, α)	23.3	Adjusted Chi Square Value (36.04, β)	22.32
95% KM Approximate Gamma UCL	0.349	95% KM Adjusted Gamma UCL	0.364

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.886	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.219	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.243	Mean in Log Scale	-1.65
SD in Original Scale	0.179	SD in Log Scale	0.701
95% t UCL (assumes normality of ROS data)	0.317	95% Percentile Bootstrap UCL	0.313
95% BCA Bootstrap UCL	0.319	95% Bootstrap t UCL	0.341
95% H-UCL (Log ROS)	0.359		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.978	KM Geo Mean	0.138
KM SD (logged)	1.006	95% Critical H Value (KM-Log)	2.647
KM Standard Error of Mean (logged)	0.289	95% H-UCL (KM -Log)	0.438
KM SD (logged)	1.006	95% Critical H Value (KM-Log)	2.647
KM Standard Error of Mean (logged)	0.289		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.404	Mean in Log Scale	-1.662
SD in Original Scale	0.457	SD in Log Scale	1.378
95% t UCL (Assumes normality)	0.591	95% H-Stat UCL	1.442

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.329

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chloroform

General Statistics

Total Number of Observations	18	Number of Distinct Observations	12
		Number of Missing Observations	409
Minimum	1.9	Mean	2.682
Maximum	3.95	Median	2.7
SD	0.543	Std. Error of Mean	0.128
Coefficient of Variation	0.202	Skewness	0.532

Normal GOF Test

Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.122	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.905	95% Adjusted-CLT UCL (Chen-1995)	2.91
		95% Modified-t UCL (Johnson-1978)	2.907

Gamma GOF Test

A-D Test Statistic	0.308	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.739	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.135	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.203	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	26.44	k star (bias corrected MLE)	22.07
Theta hat (MLE)	0.101	Theta star (bias corrected MLE)	0.122
nu hat (MLE)	951.7	nu star (bias corrected)	794.4
MLE Mean (bias corrected)	2.682	MLE Sd (bias corrected)	0.571
		Approximate Chi Square Value (0.05)	730
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	724.1

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.919	95% Adjusted Gamma UCL	2.943

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.914	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.147	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.642	Mean of logged Data	0.968
Maximum of Logged Data	1.374	SD of logged Data	0.201

Assuming Lognormal Distribution

95% H-UCL	2.929	90% Chebyshev (MVUE) UCL	3.065
95% Chebyshev (MVUE) UCL	3.238	97.5% Chebyshev (MVUE) UCL	3.478
99% Chebyshev (MVUE) UCL	3.951		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2.893	95% BCA Bootstrap UCL	2.882
95% Standard Bootstrap UCL	2.879	95% Bootstrap-t UCL	2.918
95% Hall's Bootstrap UCL	2.923	95% Percentile Bootstrap UCL	2.874
90% Chebyshev(Mean, Sd) UCL	3.066	95% Chebyshev(Mean, Sd) UCL	3.24
97.5% Chebyshev(Mean, Sd) UCL	3.481	99% Chebyshev(Mean, Sd) UCL	3.955

Suggested UCL to Use

95% Student's-t UCL	2.905

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chloromethane

General Statistics

Total Number of Observations	18	Number of Distinct Observations	15
		Number of Missing Observations	409
Number of Detects	14	Number of Non-Detects	4
Number of Distinct Detects	13	Number of Distinct Non-Detects	2
Minimum Detect	0.37	Minimum Non-Detect	0.36
Maximum Detect	1.9	Maximum Non-Detect	1.8
Variance Detects	0.237	Percent Non-Detects	22.22%
Mean Detects	1.061	SD Detects	0.487
Median Detects	0.945	CV Detects	0.459
Skewness Detects	0.557	Kurtosis Detects	-0.643
Mean of Logged Detects	-0.0448	SD of Logged Detects	0.485

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.825	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.153	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.263	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.991	KM Standard Error of Mean	0.122
90KM SD	0.471	95% KM (BCA) UCL	1.192
95% KM (t) UCL	1.204	95% KM (Percentile Bootstrap) UCL	1.191
95% KM (z) UCL	1.192	95% KM Bootstrap t UCL	1.231
90% KM Chebyshev UCL	1.357	95% KM Chebyshev UCL	1.523
97.5% KM Chebyshev UCL	1.754	99% KM Chebyshev UCL	2.206

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.172	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.738	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0985	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.229	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	4.982	k star (bias corrected MLE)	3.962
Theta hat (MLE)	0.213	Theta star (bias corrected MLE)	0.268
nu hat (MLE)	139.5	nu star (bias corrected)	110.9
Mean (detects)	1.061		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.233	Mean	0.981
Maximum	1.9	Median	0.92
SD	0.482	CV	0.491
k hat (MLE)	4.044	k star (bias corrected MLE)	3.407
Theta hat (MLE)	0.243	Theta star (bias corrected MLE)	0.288
nu hat (MLE)	145.6	nu star (bias corrected)	122.6
Adjusted Level of Significance (β)	0.0357		

Approximate Chi Square Value (122.65, α)	98.07	Adjusted Chi Square Value (122.65, β)	95.96
95% Gamma Approximate UCL	1.226	95% Gamma Adjusted UCL	1.253

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.991	SD (KM)	0.471
Variance (KM)	0.222	SE of Mean (KM)	0.122
k hat (KM)	4.433	k star (KM)	3.731
nu hat (KM)	159.6	nu star (KM)	134.3
theta hat (KM)	0.224	theta star (KM)	0.266
80% gamma percentile (KM)	1.378	90% gamma percentile (KM)	1.679
95% gamma percentile (KM)	1.958	99% gamma percentile (KM)	2.554

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (134.32, α)	108.5	Adjusted Chi Square Value (134.32, β)	106.3
95% KM Approximate Gamma UCL	1.227	95% KM Adjusted Gamma UCL	1.252

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.971	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.895	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.102	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.208	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.98	Mean in Log Scale	-0.137
SD in Original Scale	0.475	SD in Log Scale	0.513
95% t UCL (assumes normality of ROS data)	1.175	95% Percentile Bootstrap UCL	1.165
95% BCA Bootstrap UCL	1.173	95% Bootstrap t UCL	1.204
95% H-UCL (Log ROS)	1.28		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.129	KM Geo Mean	0.879
KM SD (logged)	0.505	95% Critical H Value (KM-Log)	2.026
KM Standard Error of Mean (logged)	0.133	95% H-UCL (KM -Log)	1.28
KM SD (logged)	0.505	95% Critical H Value (KM-Log)	2.026
KM Standard Error of Mean (logged)	0.133		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.985	Mean in Log Scale	-0.148
SD in Original Scale	0.475	SD in Log Scale	0.577
95% t UCL (Assumes normality)	1.18	95% H-Stat UCL	1.368

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.204

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chromium

General Statistics

Total Number of Observations	63	Number of Distinct Observations	51
		Number of Missing Observations	360
Number of Detects	62	Number of Non-Detects	1

Number of Distinct Detects	50	Number of Distinct Non-Detects	1
Minimum Detect	0.496	Minimum Non-Detect	1.7
Maximum Detect	3.46	Maximum Non-Detect	1.7
Variance Detects	0.258	Percent Non-Detects	1.587%
Mean Detects	1.752	SD Detects	0.508
Median Detects	1.655	CV Detects	0.29
Skewness Detects	0.755	Kurtosis Detects	2.359
Mean of Logged Detects	0.517	SD of Logged Detects	0.311

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.949	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	0.0233	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.113	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.13	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.747	KM Standard Error of Mean	0.0641
90KM SD	0.503	95% KM (BCA) UCL	1.847
95% KM (t) UCL	1.854	95% KM (Percentile Bootstrap) UCL	1.852
95% KM (z) UCL	1.852	95% KM Bootstrap t UCL	1.863
90% KM Chebyshev UCL	1.939	95% KM Chebyshev UCL	2.026
97.5% KM Chebyshev UCL	2.147	99% KM Chebyshev UCL	2.384

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.981	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.751	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.128	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.113	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	11.58	k star (bias corrected MLE)	11.03
Theta hat (MLE)	0.151	Theta star (bias corrected MLE)	0.159
nu hat (MLE)	1436	nu star (bias corrected)	1368
Mean (detects)	1.752		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.496	Mean	1.747
Maximum	3.46	Median	1.65
SD	0.506	CV	0.29
k hat (MLE)	11.67	k star (bias corrected MLE)	11.13
Theta hat (MLE)	0.15	Theta star (bias corrected MLE)	0.157
nu hat (MLE)	1471	nu star (bias corrected)	1402
Adjusted Level of Significance (β)	0.0462		
Approximate Chi Square Value (N/A, α)	1316	Adjusted Chi Square Value (N/A, β)	1314
95% Gamma Approximate UCL	1.861	95% Gamma Adjusted UCL	1.864

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.747	SD (KM)	0.503
Variance (KM)	0.253	SE of Mean (KM)	0.0641
k hat (KM)	12.05	k star (KM)	11.48
nu hat (KM)	1518	nu star (KM)	1447
theta hat (KM)	0.145	theta star (KM)	0.152
80% gamma percentile (KM)	2.159	90% gamma percentile (KM)	2.431

95% gamma percentile (KM)	2.672	99% gamma percentile (KM)	3.163

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (N/A, α)	1360	Adjusted Chi Square Value (N/A, β)	1358
95% KM Approximate Gamma UCL	1.859	95% KM Adjusted Gamma UCL	1.862

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.934	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk P Value	0.00333	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.145	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.103	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.746	Mean in Log Scale	0.514
SD in Original Scale	0.506	SD in Log Scale	0.309
95% t UCL (assumes normality of ROS data)	1.853	95% Percentile Bootstrap UCL	1.849
95% BCA Bootstrap UCL	1.849	95% Bootstrap t UCL	1.861
95% H-UCL (Log ROS)	1.879		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.514	KM Geo Mean	1.672
KM SD (logged)	0.308	95% Critical H Value (KM-Log)	1.757
KM Standard Error of Mean (logged)	0.0394	95% H-UCL (KM -Log)	1.878
KM SD (logged)	0.308	95% Critical H Value (KM-Log)	1.757
KM Standard Error of Mean (logged)	0.0394		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.738	Mean in Log Scale	0.506
SD in Original Scale	0.517	SD in Log Scale	0.32
95% t UCL (Assumes normality)	1.847	95% H-Stat UCL	1.876

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 1.854

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chrysene/Triphenylene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0224	Mean	0.0364
Maximum	0.0614	Median	0.0303
SD	0.0137	Std. Error of Mean	0.00457
Coefficient of Variation	0.377	Skewness	0.975

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.864	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.286	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0449	95% Adjusted-CLT UCL (Chen-1995)	0.0455
		95% Modified-t UCL (Johnson-1978)	0.0451

Gamma GOF Test

A-D Test Statistic	0.509	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.262	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	8.802	k star (bias corrected MLE)	5.942
Theta hat (MLE)	0.00413	Theta star (bias corrected MLE)	0.00612
nu hat (MLE)	158.4	nu star (bias corrected)	107
MLE Mean (bias corrected)	0.0364	MLE Sd (bias corrected)	0.0149
		Approximate Chi Square Value (0.05)	84.09
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	79.82

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0463	95% Adjusted Gamma UCL	0.0487

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.239	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-3.797	Mean of logged Data	-3.372
Maximum of Logged Data	-2.79	SD of logged Data	0.353

Assuming Lognormal Distribution

95% H-UCL	0.0474	90% Chebyshev (MVUE) UCL	0.0492
95% Chebyshev (MVUE) UCL	0.055	97.5% Chebyshev (MVUE) UCL	0.0632
99% Chebyshev (MVUE) UCL	0.0791		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0439	95% BCA Bootstrap UCL	0.0448
95% Standard Bootstrap UCL	0.0433	95% Bootstrap-t UCL	0.0496
95% Hall's Bootstrap UCL	0.0459	95% Percentile Bootstrap UCL	0.0439
90% Chebyshev(Mean, Sd) UCL	0.0501	95% Chebyshev(Mean, Sd) UCL	0.0563
97.5% Chebyshev(Mean, Sd) UCL	0.0649	99% Chebyshev(Mean, Sd) UCL	0.0818

Suggested UCL to Use

95% Student's-t UCL 0.0449

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

cis/trans Decalin

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.227	Mean	0.351
Maximum	0.484	Median	0.385
SD	0.0866	Std. Error of Mean	0.0289
Coefficient of Variation	0.247	Skewness	-0.239

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.906	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.209	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.405	95% Adjusted-CLT UCL (Chen-1995)	0.396
		95% Modified-t UCL (Johnson-1978)	0.404

Gamma GOF Test

A-D Test Statistic	0.598	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.237	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	17.18	k star (bias corrected MLE)	11.53
Theta hat (MLE)	0.0204	Theta star (bias corrected MLE)	0.0304
nu hat (MLE)	309.3	nu star (bias corrected)	207.5
MLE Mean (bias corrected)	0.351	MLE Sd (bias corrected)	0.103
		Approximate Chi Square Value (0.05)	175.2
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	168.9

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.416	95% Adjusted Gamma UCL	0.431

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.882	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.235	**Lilliefors Lognormal GOF Test**

10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-1.481	Mean of logged Data	-1.076
Maximum of Logged Data	-0.726	SD of logged Data	0.263

Assuming Lognormal Distribution

95% H-UCL	0.424	90% Chebyshev (MVUE) UCL	0.444
95% Chebyshev (MVUE) UCL	0.486	97.5% Chebyshev (MVUE) UCL	0.544
99% Chebyshev (MVUE) UCL	0.659		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.399	95% BCA Bootstrap UCL	0.393
95% Standard Bootstrap UCL	0.395	95% Bootstrap-t UCL	0.399
95% Hall's Bootstrap UCL	0.393	95% Percentile Bootstrap UCL	0.396
90% Chebyshev(Mean, Sd) UCL	0.438	95% Chebyshev(Mean, Sd) UCL	0.477
97.5% Chebyshev(Mean, Sd) UCL	0.531	99% Chebyshev(Mean, Sd) UCL	0.638

Suggested UCL to Use

95% Student's-t UCL	0.405

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

cis-1,2-Dichloroethene

General Statistics

Total Number of Observations	18	Number of Distinct Observations	7
		Number of Missing Observations	409
Number of Detects	6	Number of Non-Detects	12
Number of Distinct Detects	3	Number of Distinct Non-Detects	5
Minimum Detect	0.04	Minimum Non-Detect	0.01
Maximum Detect	0.07	Maximum Non-Detect	1.8
Variance Detects	1.5000E-4	Percent Non-Detects	66.67%
Mean Detects	0.055	SD Detects	0.0122
Median Detects	0.05	CV Detects	0.223
Skewness Detects	0.49	Kurtosis Detects	-1.467
Mean of Logged Detects	-2.921	SD of Logged Detects	0.22

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.827	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.713	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.325	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.373	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.031	KM Standard Error of Mean	0.00721
90KM SD	0.0231	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0435	95% KM (Percentile Bootstrap) UCL	N/A

95% KM (z) UCL	0.0429	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0526	95% KM Chebyshev UCL	0.0624
97.5% KM Chebyshev UCL	0.076	99% KM Chebyshev UCL	0.103

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.621	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.697	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.322	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.332	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	24.74	k star (bias corrected MLE)	12.48
Theta hat (MLE)	0.00222	Theta star (bias corrected MLE)	0.00441
nu hat (MLE)	296.9	nu star (bias corrected)	149.8
Mean (detects)	0.055		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.014	Mean	0.0371
Maximum	0.07	Median	0.0359
SD	0.0169	CV	0.454
k hat (MLE)	5.073	k star (bias corrected MLE)	4.265
Theta hat (MLE)	0.00732	Theta star (bias corrected MLE)	0.0087
nu hat (MLE)	182.6	nu star (bias corrected)	153.5
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (153.54, α)	125.9	Adjusted Chi Square Value (153.54, β)	123.5
95% Gamma Approximate UCL	0.0453	95% Gamma Adjusted UCL	0.0461

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.031	SD (KM)	0.0231
Variance (KM)	5.3186E-4	SE of Mean (KM)	0.00721
k hat (KM)	1.807	k star (KM)	1.543
nu hat (KM)	65.05	nu star (KM)	55.54
theta hat (KM)	0.0172	theta star (KM)	0.0201
80% gamma percentile (KM)	0.0478	90% gamma percentile (KM)	0.0642
95% gamma percentile (KM)	0.08	99% gamma percentile (KM)	0.116

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (55.54, α)	39.41	Adjusted Chi Square Value (55.54, β)	38.11
95% KM Approximate Gamma UCL	0.0437	95% KM Adjusted Gamma UCL	0.0452

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.851	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.826	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.3	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.298	Detected Data Not Lognormal at 10% Significance Level

Detected Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.04	Mean in Log Scale	-3.275
SD in Original Scale	0.0142	SD in Log Scale	0.335
95% t UCL (assumes normality of ROS data)	0.0458	95% Percentile Bootstrap UCL	0.0458
95% BCA Bootstrap UCL	0.0461	95% Bootstrap t UCL	0.0472

95% H-UCL (Log ROS)	0.0466

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.804	KM Geo Mean	0.0223
KM SD (logged)	0.837	95% Critical H Value (KM-Log)	2.411
KM Standard Error of Mean (logged)	0.271	95% H-UCL (KM -Log)	0.0516
KM SD (logged)	0.837	95% Critical H Value (KM-Log)	2.411
KM Standard Error of Mean (logged)	0.271		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.186	Mean in Log Scale	-2.941
SD in Original Scale	0.331	SD in Log Scale	1.563
95% t UCL (Assumes normality)	0.322	95% H-Stat UCL	0.686

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0435

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Copper

General Statistics

Total Number of Observations	62	Number of Distinct Observations	57
		Number of Missing Observations	361
Minimum	11.6	Mean	37.34
Maximum	115	Median	36.05
SD	13.8	Std. Error of Mean	1.753
Coefficient of Variation	0.37	Skewness	2.823

Normal GOF Test

Shapiro Wilk Test Statistic	0.794	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	1.678E-11	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.173	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.13	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	40.27	95% Adjusted-CLT UCL (Chen-1995)	40.9
		95% Modified-t UCL (Johnson-1978)	40.38

Gamma GOF Test

A-D Test Statistic	1.802	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.752	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.151	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.905	k star (bias corrected MLE)	8.485
Theta hat (MLE)	4.193	Theta star (bias corrected MLE)	4.401

nu hat (MLE)	1104	nu star (bias corrected)	1052
MLE Mean (bias corrected)	37.34	MLE Sd (bias corrected)	12.82
		Approximate Chi Square Value (0.05)	977.9
Adjusted Level of Significance	0.0461	Adjusted Chi Square Value	976.2

Assuming Gamma Distribution

95% Approximate Gamma UCL	40.18	95% Adjusted Gamma UCL	40.25

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	1.8263E-4	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.172	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.103	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.451	Mean of logged Data	3.563
Maximum of Logged Data	4.745	SD of logged Data	0.345

Assuming Lognormal Distribution

95% H-UCL	40.48	90% Chebyshev (MVUE) UCL	42.43
95% Chebyshev (MVUE) UCL	44.71	97.5% Chebyshev (MVUE) UCL	47.87
99% Chebyshev (MVUE) UCL	54.09		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	40.23	95% BCA Bootstrap UCL	41.05
95% Standard Bootstrap UCL	40.08	95% Bootstrap-t UCL	41.06
95% Hall's Bootstrap UCL	43.52	95% Percentile Bootstrap UCL	40.2
90% Chebyshev(Mean, Sd) UCL	42.6	95% Chebyshev(Mean, Sd) UCL	44.98
97.5% Chebyshev(Mean, Sd) UCL	48.29	99% Chebyshev(Mean, Sd) UCL	54.78

Suggested UCL to Use

95% Student's-t UCL	40.27

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Cyanide, Total

General Statistics

Total Number of Observations	60	Number of Distinct Observations	24
		Number of Missing Observations	354
Number of Detects	26	Number of Non-Detects	34
Number of Distinct Detects	20	Number of Distinct Non-Detects	4
Minimum Detect	6.0000E-4	Minimum Non-Detect	0.3
Maximum Detect	9	Maximum Non-Detect	0.9
Variance Detects	7.442	Percent Non-Detects	56.67%
Mean Detects	1.992	SD Detects	2.728
Median Detects	0.9	CV Detects	1.369
Skewness Detects	1.417	Kurtosis Detects	0.755
Mean of Logged Detects	-2.166	SD of Logged Detects	3.875

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.743	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.891	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.268	**Lilliefors GOF Test**

1% Lilliefors Critical Value	0.199	Detected Data Not Normal at 1% Significance Level	

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.894	KM Standard Error of Mean	0.266
90KM SD	2.01	95% KM (BCA) UCL	1.397
95% KM (t) UCL	1.338	95% KM (Percentile Bootstrap) UCL	1.355
95% KM (z) UCL	1.331	95% KM Bootstrap t UCL	1.498
90% KM Chebyshev UCL	1.691	95% KM Chebyshev UCL	2.052
97.5% KM Chebyshev UCL	2.553	99% KM Chebyshev UCL	3.537

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.532	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.877	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.206	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.188	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.249	k star (bias corrected MLE)	0.246
Theta hat (MLE)	8.003	Theta star (bias corrected MLE)	8.104
nu hat (MLE)	12.95	nu star (bias corrected)	12.79
Mean (detects)	1.992		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	6.0000E-4	Mean	0.918
Maximum	9	Median	0.01
SD	2.018	CV	2.199
k hat (MLE)	0.237	k star (bias corrected MLE)	0.237
Theta hat (MLE)	3.869	Theta star (bias corrected MLE)	3.881
nu hat (MLE)	28.47	nu star (bias corrected)	28.38
Adjusted Level of Significance (β)	0.046		
Approximate Chi Square Value (28.38, α)	17.22	Adjusted Chi Square Value (28.38, β)	17.01
95% Gamma Approximate UCL	1.512	95% Gamma Adjusted UCL	1.532

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.894	SD (KM)	2.01
Variance (KM)	4.039	SE of Mean (KM)	0.266
k hat (KM)	0.198	k star (KM)	0.199
nu hat (KM)	23.73	nu star (KM)	23.88
theta hat (KM)	4.519	theta star (KM)	4.491
80% gamma percentile (KM)	1.175	90% gamma percentile (KM)	2.703
95% gamma percentile (KM)	4.611	99% gamma percentile (KM)	9.869

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (23.88, α)	13.76	Adjusted Chi Square Value (23.88, β)	13.57
95% KM Approximate Gamma UCL	1.551	95% KM Adjusted Gamma UCL	1.573

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.786	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.933	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.257	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.156	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.875	Mean in Log Scale	-4.13
SD in Original Scale	2.031	SD in Log Scale	3.531
95% t UCL (assumes normality of ROS data)	1.313	95% Percentile Bootstrap UCL	1.317
95% BCA Bootstrap UCL	1.398	95% Bootstrap t UCL	1.486
95% H-UCL (Log ROS)	162.2		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.462	KM Geo Mean	0.0115
KM SD (logged)	3.534	95% Critical H Value (KM-Log)	6.502
KM Standard Error of Mean (logged)	0.57	95% H-UCL (KM -Log)	118.5
KM SD (logged)	3.534	95% Critical H Value (KM-Log)	6.502
KM Standard Error of Mean (logged)	0.57		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.059	Mean in Log Scale	-1.572
SD in Original Scale	1.959	SD in Log Scale	2.589
95% t UCL (Assumes normality)	1.481	95% H-Stat UCL	32.78

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 1.338

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Demeton-O,S

General Statistics

Total Number of Observations	18	Number of Distinct Observations	13
		Number of Missing Observations	388
Number of Detects	1	Number of Non-Detects	17
Number of Distinct Detects	1	Number of Distinct Non-Detects	12

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Demeton-O,S was not processed!

Dibenzo(a,h)anthracene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	17
		Number of Missing Observations	381
Number of Detects	2	Number of Non-Detects	25
Number of Distinct Detects	2	Number of Distinct Non-Detects	15
Minimum Detect	0.00529	Minimum Non-Detect	0.00114
Maximum Detect	0.00668	Maximum Non-Detect	150
Variance Detects	9.6911E-7	Percent Non-Detects	92.59%

Mean Detects	0.00598	SD Detects	9.8443E-4
Median Detects	0.00598	CV Detects	0.165
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-5.126	SD of Logged Detects	0.165

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00221	KM Standard Error of Mean	9.6206E-4
90KM SD	0.00204	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.00385	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0038	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0051	95% KM Chebyshev UCL	0.00641
97.5% KM Chebyshev UCL	0.00822	99% KM Chebyshev UCL	0.0118

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	73.49	k star (bias corrected MLE)	N/A
Theta hat (MLE)	8.1384E-5	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	294	nu star (bias corrected)	N/A
Mean (detects)	0.00598		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00221	SD (KM)	0.00204
Variance (KM)	4.1650E-6	SE of Mean (KM)	9.6206E-4
k hat (KM)	1.176	k star (KM)	1.07
nu hat (KM)	63.48	nu star (KM)	57.76
theta hat (KM)	0.00188	theta star (KM)	0.00207
80% gamma percentile (KM)	0.00354	90% gamma percentile (KM)	0.00501
95% gamma percentile (KM)	0.00647	99% gamma percentile (KM)	0.00985

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0401
Approximate Chi Square Value (57.76, α)	41.29	Adjusted Chi Square Value (57.76, β)	40.4
95% KM Approximate Gamma UCL	0.0031	95% KM Adjusted Gamma UCL	0.00316

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00304	Mean in Log Scale	-5.845
SD in Original Scale	0.00107	SD in Log Scale	0.311
95% t UCL (assumes normality of ROS data)	0.00339	95% Percentile Bootstrap UCL	0.00339
95% BCA Bootstrap UCL	0.00349	95% Bootstrap t UCL	0.00353
95% H-UCL (Log ROS)	0.0034		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.413	KM Geo Mean	0.00164
KM SD (logged)	0.69	95% Critical H Value (KM-Log)	2.15
KM Standard Error of Mean (logged)	0.325	95% H-UCL (KM -Log)	0.00278
KM SD (logged)	0.69	95% Critical H Value (KM-Log)	2.15
KM Standard Error of Mean (logged)	0.325		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	4.141	Mean in Log Scale	-2.354
SD in Original Scale	14.51	SD in Log Scale	3.687
95% t UCL (Assumes normality)	8.903	95% H-Stat UCL	12980

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 0.00385

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dibenzofuran

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.00921	Mean	0.0401
Maximum	0.0698	Median	0.0435
SD	0.0178	Std. Error of Mean	0.00594
Coefficient of Variation	0.444	Skewness	-0.113

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.988	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.131	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.0511	95% Adjusted-CLT UCL (Chen-1995)	0.0496
		95% Modified-t UCL (Johnson-1978)	0.0511

Gamma GOF Test

A-D Test Statistic	0.341	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.185	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	4.171	k star (bias corrected MLE)	2.855
Theta hat (MLE)	0.00961	Theta star (bias corrected MLE)	0.014
nu hat (MLE)	75.08	nu star (bias corrected)	51.39

MLE Mean (bias corrected)	0.0401	MLE Sd (bias corrected)	0.0237
		Approximate Chi Square Value (0.05)	35.92
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	33.22

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0573	95% Adjusted Gamma UCL	0.062

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.871	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.191	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-4.687	Mean of logged Data	-3.342
Maximum of Logged Data	-2.663	SD of logged Data	0.594

Assuming Lognormal Distribution

95% H-UCL	0.0702	90% Chebyshev (MVUE) UCL	0.0663
95% Chebyshev (MVUE) UCL	0.0776	97.5% Chebyshev (MVUE) UCL	0.0933
99% Chebyshev (MVUE) UCL	0.124		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0498	95% BCA Bootstrap UCL	0.0491
95% Standard Bootstrap UCL	0.0491	95% Bootstrap-t UCL	0.0508
95% Hall's Bootstrap UCL	0.0503	95% Percentile Bootstrap UCL	0.0493
90% Chebyshev(Mean, Sd) UCL	0.0579	95% Chebyshev(Mean, Sd) UCL	0.0659
97.5% Chebyshev(Mean, Sd) UCL	0.0771	99% Chebyshev(Mean, Sd) UCL	0.0991

Suggested UCL to Use

95% Student's-t UCL	0.0511

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Dibenzothiophene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	0.0182	Mean	0.0251
Maximum	0.0335	Median	0.0227
SD	0.00553	Std. Error of Mean	0.00184
Coefficient of Variation	0.221	Skewness	0.46

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach, refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance, but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7). The Chebyshev UCL often results in gross overestimates of the mean. Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.917	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.218	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0285	95% Adjusted-CLT UCL (Chen-1995)	0.0284
		95% Modified-t UCL (Johnson-1978)	0.0285

Gamma GOF Test

A-D Test Statistic	0.351	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.209	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	23.68	k star (bias corrected MLE)	15.86
Theta hat (MLE)	0.00106	Theta star (bias corrected MLE)	0.00158
nu hat (MLE)	426.3	nu star (bias corrected)	285.5
MLE Mean (bias corrected)	0.0251	MLE Sd (bias corrected)	0.00629
		Approximate Chi Square Value (0.05)	247.4
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	239.9

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0289	95% Adjusted Gamma UCL	0.0298

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.191	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-4.008	Mean of logged Data	-3.708
Maximum of Logged Data	-3.397	SD of logged Data	0.218

Assuming Lognormal Distribution

95% H-UCL	0.0291	90% Chebyshev (MVUE) UCL	0.0305
95% Chebyshev (MVUE) UCL	0.033	97.5% Chebyshev (MVUE) UCL	0.0365
99% Chebyshev (MVUE) UCL	0.0432		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0281	95% BCA Bootstrap UCL	0.0281
95% Standard Bootstrap UCL	0.0279	95% Bootstrap-t UCL	0.0291
95% Hall's Bootstrap UCL	0.0283	95% Percentile Bootstrap UCL	0.0279
90% Chebyshev(Mean, Sd) UCL	0.0306	95% Chebyshev(Mean, Sd) UCL	0.0331
97.5% Chebyshev(Mean, Sd) UCL	0.0366	99% Chebyshev(Mean, Sd) UCL	0.0434

Suggested UCL to Use

95% Student's-t UCL 0.0285

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dichloromethane (Methylene Chloride)

General Statistics

Total Number of Observations	18	Number of Distinct Observations	18
		Number of Missing Observations	409
Number of Detects	16	Number of Non-Detects	2
Number of Distinct Detects	16	Number of Distinct Non-Detects	2
Minimum Detect	0.39	Minimum Non-Detect	0.01
Maximum Detect	6.85	Maximum Non-Detect	0.21
Variance Detects	2.861	Percent Non-Detects	11.11%
Mean Detects	2.626	SD Detects	1.691
Median Detects	2.5	CV Detects	0.644
Skewness Detects	1.075	Kurtosis Detects	1.361
Mean of Logged Detects	0.746	SD of Logged Detects	0.735

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.169	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.335	KM Standard Error of Mean	0.426
90KM SD	1.749	95% KM (BCA) UCL	3.041
95% KM (t) UCL	3.076	95% KM (Percentile Bootstrap) UCL	3.041
95% KM (z) UCL	3.035	95% KM Bootstrap t UCL	3.212
90% KM Chebyshev UCL	3.612	95% KM Chebyshev UCL	4.191
97.5% KM Chebyshev UCL	4.994	99% KM Chebyshev UCL	6.572

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.203	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.124	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.217	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.436	k star (bias corrected MLE)	2.021
Theta hat (MLE)	1.078	Theta star (bias corrected MLE)	1.299
nu hat (MLE)	77.96	nu star (bias corrected)	64.68
Mean (detects)	2.626		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.335
Maximum	6.85	Median	2.15
SD	1.8	CV	0.771
k hat (MLE)	0.846	k star (bias corrected MLE)	0.742

Theta hat (MLE)	2.76	Theta star (bias corrected MLE)	3.146
nu hat (MLE)	30.46	nu star (bias corrected)	26.72
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (26.72, α)	15.93	Adjusted Chi Square Value (26.72, β)	15.14
95% Gamma Approximate UCL	3.916	95% Gamma Adjusted UCL	4.122

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.335	SD (KM)	1.749
Variance (KM)	3.06	SE of Mean (KM)	0.426
k hat (KM)	1.782	k star (KM)	1.522
nu hat (KM)	64.15	nu star (KM)	54.79
theta hat (KM)	1.31	theta star (KM)	1.534
80% gamma percentile (KM)	3.607	90% gamma percentile (KM)	4.848
95% gamma percentile (KM)	6.053	99% gamma percentile (KM)	8.77

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (54.79, α)	38.78	Adjusted Chi Square Value (54.79, β)	37.49
95% KM Approximate Gamma UCL	3.299	95% KM Adjusted Gamma UCL	3.413

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.906	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.15	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.196	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.378	Mean in Log Scale	0.561
SD in Original Scale	1.745	SD in Log Scale	0.877
95% t UCL (assumes normality of ROS data)	3.093	95% Percentile Bootstrap UCL	3.05
95% BCA Bootstrap UCL	3.122	95% Bootstrap t UCL	3.25
95% H-UCL (Log ROS)	4.343		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.152	KM Geo Mean	1.164
KM SD (logged)	1.811	95% Critical H Value (KM-Log)	3.974
KM Standard Error of Mean (logged)	0.441	95% H-UCL (KM -Log)	34.34
KM SD (logged)	1.811	95% Critical H Value (KM-Log)	3.974
KM Standard Error of Mean (logged)	0.441		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.34	Mean in Log Scale	0.244
SD in Original Scale	1.793	SD in Log Scale	1.699
95% t UCL (Assumes normality)	3.075	95% H-Stat UCL	25.66

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	3.076

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dieldrin

General Statistics

Total Number of Observations	18	Number of Distinct Observations	14
		Number of Missing Observations	386
Number of Detects	2	Number of Non-Detects	16
Number of Distinct Detects	2	Number of Distinct Non-Detects	12
Minimum Detect	0.0088	Minimum Non-Detect	3.6000E-4
Maximum Detect	0.014	Maximum Non-Detect	0.056
Variance Detects	1.3520E-5	Percent Non-Detects	88.89%
Mean Detects	0.0114	SD Detects	0.00368
Median Detects	0.0114	CV Detects	0.323
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-4.501	SD of Logged Detects	0.328

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0022	KM Standard Error of Mean	0.00173
90KM SD	0.00425	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.00522	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.00505	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0074	95% KM Chebyshev UCL	0.00976
97.5% KM Chebyshev UCL	0.013	99% KM Chebyshev UCL	0.0195

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	18.89	k star (bias corrected MLE)	N/A
Theta hat (MLE)	6.0364E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	75.54	nu star (bias corrected)	N/A
Mean (detects)	0.0114		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0022	SD (KM)	0.00425
Variance (KM)	1.8055E-5	SE of Mean (KM)	0.00173
k hat (KM)	0.268	k star (KM)	0.26
nu hat (KM)	9.651	nu star (KM)	9.376
theta hat (KM)	0.00821	theta star (KM)	0.00845
80% gamma percentile (KM)	0.00324	90% gamma percentile (KM)	0.00658
95% gamma percentile (KM)	0.0105	99% gamma percentile (KM)	0.0209

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0357
Approximate Chi Square Value (9.38, α)	3.555	Adjusted Chi Square Value (9.38, β)	3.219
95% KM Approximate Gamma UCL	0.0058	95% KM Adjusted Gamma UCL	0.00641

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00281	Mean in Log Scale	-6.212
SD in Original Scale	0.00331	SD in Log Scale	0.726
95% t UCL (assumes normality of ROS data)	0.00417	95% Percentile Bootstrap UCL	0.00421
95% BCA Bootstrap UCL	0.00479	95% Bootstrap t UCL	0.00902
95% H-UCL (Log ROS)	0.00389		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-7.358	KM Geo Mean	6.3748E-4
KM SD (logged)	1.281	95% Critical H Value (KM-Log)	3.071
KM Standard Error of Mean (logged)	0.523	95% H-UCL (KM -Log)	0.00376
KM SD (logged)	1.281	95% Critical H Value (KM-Log)	3.071
KM Standard Error of Mean (logged)	0.523		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00832	Mean in Log Scale	-5.437
SD in Original Scale	0.0084	SD in Log Scale	1.345
95% t UCL (Assumes normality)	0.0118	95% H-Stat UCL	0.0303

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 0.00522

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Diethyl Phthalate

General Statistics

Total Number of Observations	18	Number of Distinct Observations	16
		Number of Missing Observations	390
Number of Detects	13	Number of Non-Detects	5
Number of Distinct Detects	11	Number of Distinct Non-Detects	5
Minimum Detect	1.5	Minimum Non-Detect	1.3
Maximum Detect	3.7	Maximum Non-Detect	170
Variance Detects	0.394	Percent Non-Detects	27.78%
Mean Detects	2.492	SD Detects	0.628
Median Detects	2.4	CV Detects	0.252
Skewness Detects	0.389	Kurtosis Detects	-0.442
Mean of Logged Detects	0.884	SD of Logged Detects	0.254

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.814	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.141	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.271	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	2.407	KM Standard Error of Mean	0.183
90KM SD	0.657	95% KM (BCA) UCL	2.682
95% KM (t) UCL	2.725	95% KM (Percentile Bootstrap) UCL	2.7
95% KM (z) UCL	2.708	95% KM Bootstrap t UCL	2.76
90% KM Chebyshev UCL	2.956	95% KM Chebyshev UCL	3.204
97.5% KM Chebyshev UCL	3.549	99% KM Chebyshev UCL	4.227

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.181	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.733	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.126	**Kolmogorov-Smirnov GOF**	

5% K-S Critical Value	0.236	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	17.09	k star (bias corrected MLE)	13.2
Theta hat (MLE)	0.146	Theta star (bias corrected MLE)	0.189
nu hat (MLE)	444.4	nu star (bias corrected)	343.1
Mean (detects)	2.492		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	1.151	Mean	2.388
Maximum	3.7	Median	2.36
SD	0.614	CV	0.257
k hat (MLE)	14.97	k star (bias corrected MLE)	12.51
Theta hat (MLE)	0.16	Theta star (bias corrected MLE)	0.191
nu hat (MLE)	538.8	nu star (bias corrected)	450.4
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (450.36, α)	402.2	Adjusted Chi Square Value (450.36, β)	397.8
95% Gamma Approximate UCL	2.675	95% Gamma Adjusted UCL	2.704

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	2.407	SD (KM)	0.657
Variance (KM)	0.432	SE of Mean (KM)	0.183
k hat (KM)	13.41	k star (KM)	11.21
nu hat (KM)	482.8	nu star (KM)	403.6
theta hat (KM)	0.18	theta star (KM)	0.215
80% gamma percentile (KM)	2.982	90% gamma percentile (KM)	3.362
95% gamma percentile (KM)	3.699	99% gamma percentile (KM)	4.386

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (403.63, α)	358.1	Adjusted Chi Square Value (403.63, β)	353.9
95% KM Approximate Gamma UCL	2.713	95% KM Adjusted Gamma UCL	2.745

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.982	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.889	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.107	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.215	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.388	Mean in Log Scale	0.84
SD in Original Scale	0.598	SD in Log Scale	0.259
95% t UCL (assumes normality of ROS data)	2.634	95% Percentile Bootstrap UCL	2.633
95% BCA Bootstrap UCL	2.635	95% Bootstrap t UCL	2.654
95% H-UCL (Log ROS)	2.686		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.839	KM Geo Mean	2.315
KM SD (logged)	0.285	95% Critical H Value (KM-Log)	1.842
KM Standard Error of Mean (logged)	0.0792	95% H-UCL (KM -Log)	2.738
KM SD (logged)	0.285	95% Critical H Value (KM-Log)	1.842
KM Standard Error of Mean (logged)	0.0792		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	8.219	Mean in Log Scale	1.22
SD in Original Scale	19.52	SD in Log Scale	1.054
95% t UCL (Assumes normality)	16.22	95% H-Stat UCL	11.81

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	2.725

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dimethyl Phthalate

General Statistics

Total Number of Observations	15	Number of Distinct Observations	10
		Number of Missing Observations	392
Number of Detects	1	Number of Non-Detects	14
Number of Distinct Detects	1	Number of Distinct Non-Detects	9

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Dimethyl Phthalate was not processed!

Di-n-butyl Phthalate

General Statistics

Total Number of Observations	18	Number of Distinct Observations	15
		Number of Missing Observations	390
Number of Detects	5	Number of Non-Detects	13
Number of Distinct Detects	5	Number of Distinct Non-Detects	10
Minimum Detect	0.36	Minimum Non-Detect	0.46
Maximum Detect	0.84	Maximum Non-Detect	220
Variance Detects	0.0376	Percent Non-Detects	72.22%
Mean Detects	0.64	SD Detects	0.194
Median Detects	0.64	CV Detects	0.303
Skewness Detects	-0.593	Kurtosis Detects	-0.535
Mean of Logged Detects	-0.489	SD of Logged Detects	0.34

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.195	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.593	KM Standard Error of Mean	0.0865
90KM SD	0.19	95% KM (BCA) UCL	0.743
95% KM (t) UCL	0.744	95% KM (Percentile Bootstrap) UCL	0.735
95% KM (z) UCL	0.736	95% KM Bootstrap t UCL	0.75

90% KM Chebyshev UCL	0.853	95% KM Chebyshev UCL	0.971
97.5% KM Chebyshev UCL	1.134	99% KM Chebyshev UCL	1.454

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.3	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.679	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.214	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.358	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	11.86	k star (bias corrected MLE)	4.876
Theta hat (MLE)	0.054	Theta star (bias corrected MLE)	0.131
nu hat (MLE)	118.6	nu star (bias corrected)	48.76
Mean (detects)	0.64		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.36	Mean	0.588
Maximum	0.84	Median	0.583
SD	0.127	CV	0.216
k hat (MLE)	21.71	k star (bias corrected MLE)	18.13
Theta hat (MLE)	0.0271	Theta star (bias corrected MLE)	0.0324
nu hat (MLE)	781.7	nu star (bias corrected)	652.7
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (652.71, α)	594.4	Adjusted Chi Square Value (652.71, β)	589.1
95% Gamma Approximate UCL	0.646	95% Gamma Adjusted UCL	0.652

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.593	SD (KM)	0.19
Variance (KM)	0.036	SE of Mean (KM)	0.0865
k hat (KM)	9.791	k star (KM)	8.196
nu hat (KM)	352.5	nu star (KM)	295.1
theta hat (KM)	0.0606	theta star (KM)	0.0724
80% gamma percentile (KM)	0.757	90% gamma percentile (KM)	0.87
95% gamma percentile (KM)	0.97	99% gamma percentile (KM)	1.178

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (295.07, α)	256.3	Adjusted Chi Square Value (295.07, β)	252.8
95% KM Approximate Gamma UCL	0.683	95% KM Adjusted Gamma UCL	0.693

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.195	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.579	Mean in Log Scale	-0.57
SD in Original Scale	0.128	SD in Log Scale	0.226
95% t UCL (assumes normality of ROS data)	0.632	95% Percentile Bootstrap UCL	0.63

95% BCA Bootstrap UCL	0.631	95% Bootstrap t UCL	0.633
95% H-UCL (Log ROS)	0.641		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.578	KM Geo Mean	0.561
KM SD (logged)	0.342	95% Critical H Value (KM-Log)	1.884
KM Standard Error of Mean (logged)	0.156	95% H-UCL (KM -Log)	0.695
KM SD (logged)	0.342	95% Critical H Value (KM-Log)	1.884
KM Standard Error of Mean (logged)	0.156		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	10.84	Mean in Log Scale	1.028
SD in Original Scale	25.38	SD in Log Scale	1.671
95% t UCL (Assumes normality)	21.24	95% H-Stat UCL	51.14

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.744

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Di-n-octyl Phthalate

General Statistics

Total Number of Observations	15	Number of Distinct Observations	11
		Number of Missing Observations	392
Number of Detects	2	Number of Non-Detects	13
Number of Distinct Detects	2	Number of Distinct Non-Detects	9
Minimum Detect	1.5	Minimum Non-Detect	0.17
Maximum Detect	18.9	Maximum Non-Detect	3.3
Variance Detects	151.4	Percent Non-Detects	86.67%
Mean Detects	10.2	SD Detects	12.3
Median Detects	10.2	CV Detects	1.206
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	1.672	SD of Logged Detects	1.792

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.557	KM Standard Error of Mean	1.703
90KM SD	4.653	95% KM (BCA) UCL	N/A
95% KM (t) UCL	4.555	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	4.357	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	6.664	95% KM Chebyshev UCL	8.978
97.5% KM Chebyshev UCL	12.19	99% KM Chebyshev UCL	18.5

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.899	k star (bias corrected MLE)	N/A
Theta hat (MLE)	11.34	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	3.597	nu star (bias corrected)	N/A
Mean (detects)	10.2		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.557	SD (KM)	4.653
Variance (KM)	21.65	SE of Mean (KM)	1.703
k hat (KM)	0.112	k star (KM)	0.134
nu hat (KM)	3.358	nu star (KM)	4.02
theta hat (KM)	13.91	theta star (KM)	11.62
80% gamma percentile (KM)	1.532	90% gamma percentile (KM)	4.528
95% gamma percentile (KM)	8.742	99% gamma percentile (KM)	21.27

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0324
Approximate Chi Square Value (4.02, α)	0.729	Adjusted Chi Square Value (4.02, β)	0.579
95% KM Approximate Gamma UCL	8.578	95% KM Adjusted Gamma UCL	10.8

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.374	Mean in Log Scale	-3.992
SD in Original Scale	4.864	SD in Log Scale	2.639
95% t UCL (assumes normality of ROS data)	3.586	95% Percentile Bootstrap UCL	3.794
95% BCA Bootstrap UCL	5.352	95% Bootstrap t UCL	348.7
95% H-UCL (Log ROS)	36.88		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.232	KM Geo Mean	0.292
KM SD (logged)	1.296	95% Critical H Value (KM-Log)	3.244
KM Standard Error of Mean (logged)	0.506	95% H-UCL (KM -Log)	2.078
KM SD (logged)	1.296	95% Critical H Value (KM-Log)	3.244
KM Standard Error of Mean (logged)	0.506		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.964	Mean in Log Scale	-0.484
SD in Original Scale	4.724	SD in Log Scale	1.392
95% t UCL (Assumes normality)	4.112	95% H-Stat UCL	5.79

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL	4.555

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dissolved Antimony

General Statistics

Total Number of Observations	54	Number of Distinct Observations	48
		Number of Missing Observations	332
Minimum	0.448	Mean	0.562
Maximum	0.806	Median	0.551
SD	0.0746	Std. Error of Mean	0.0102
Coefficient of Variation	0.133	Skewness	1.171

Normal GOF Test

Shapiro Wilk Test Statistic	0.922	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	0.00168	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.0916	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.139	Data appear Normal at 1% Significance Level	

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.579	95% Adjusted-CLT UCL (Chen-1995)	0.58
		95% Modified-t UCL (Johnson-1978)	0.579

Gamma GOF Test

A-D Test Statistic	0.545	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.0736	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.121	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	62.03	k star (bias corrected MLE)	58.6
Theta hat (MLE)	0.00906	Theta star (bias corrected MLE)	0.00959
nu hat (MLE)	6699	nu star (bias corrected)	6328
MLE Mean (bias corrected)	0.562	MLE Sd (bias corrected)	0.0734
		Approximate Chi Square Value (0.05)	6144
Adjusted Level of Significance	0.0456	Adjusted Chi Square Value	6140

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.579	95% Adjusted Gamma UCL	0.579

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.957	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.101	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0693	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.11	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.803	Mean of logged Data	-0.585
Maximum of Logged Data	-0.216	SD of logged Data	0.126

Assuming Lognormal Distribution

95% H-UCL	0.579	90% Chebyshev (MVUE) UCL	0.591
95% Chebyshev (MVUE) UCL	0.604	97.5% Chebyshev (MVUE) UCL	0.622
99% Chebyshev (MVUE) UCL	0.658		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.578	95% BCA Bootstrap UCL	0.579
95% Standard Bootstrap UCL	0.578	95% Bootstrap-t UCL	0.58
95% Hall's Bootstrap UCL	0.581	95% Percentile Bootstrap UCL	0.578
90% Chebyshev(Mean, Sd) UCL	0.592	95% Chebyshev(Mean, Sd) UCL	0.606
97.5% Chebyshev(Mean, Sd) UCL	0.625	99% Chebyshev(Mean, Sd) UCL	0.663

Suggested UCL to Use

95% Student's-t UCL 0.579

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dissolved Arsenic

General Statistics

Total Number of Observations	63	Number of Distinct Observations	50
		Number of Missing Observations	324
Minimum	0.596	Mean	2.127
Maximum	2.78	Median	2.22
SD	0.488	Std. Error of Mean	0.0615
Coefficient of Variation	0.229	Skewness	-1.482

Normal GOF Test

Shapiro Wilk Test Statistic	0.836	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	2.6718E-9	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.231	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.129	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.229	95% Adjusted-CLT UCL (Chen-1995)	2.215
		95% Modified-t UCL (Johnson-1978)	2.227

Gamma GOF Test

A-D Test Statistic	5.39	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.75	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.284	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.112	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	13.33	k star (bias corrected MLE)	12.71
Theta hat (MLE)	0.159	Theta star (bias corrected MLE)	0.167
nu hat (MLE)	1680	nu star (bias corrected)	1601
MLE Mean (bias corrected)	2.127	MLE Sd (bias corrected)	0.597
		Approximate Chi Square Value (0.05)	1509
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	1507

Assuming Gamma Distribution

95% Approximate Gamma UCL	2.256	95% Adjusted Gamma UCL	2.259

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.714	**Shapiro Wilk Lognormal GOF Test**

10% Shapiro Wilk P Value	4.441E-16	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.308	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.102	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.518	Mean of logged Data	0.717
Maximum of Logged Data	1.022	SD of logged Data	0.309

Assuming Lognormal Distribution

95% H-UCL	2.3	90% Chebyshev (MVUE) UCL	2.401
95% Chebyshev (MVUE) UCL	2.517	97.5% Chebyshev (MVUE) UCL	2.678
99% Chebyshev (MVUE) UCL	2.993		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	2.228	95% BCA Bootstrap UCL	2.213
95% Standard Bootstrap UCL	2.225	95% Bootstrap-t UCL	2.217
95% Hall's Bootstrap UCL	2.215	95% Percentile Bootstrap UCL	2.22
90% Chebyshev(Mean, Sd) UCL	2.311	95% Chebyshev(Mean, Sd) UCL	2.394
97.5% Chebyshev(Mean, Sd) UCL	2.51	99% Chebyshev(Mean, Sd) UCL	2.738

Suggested UCL to Use

95% Student's-t UCL	2.229

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Dissolved Beryllium

General Statistics

Total Number of Observations	54	Number of Distinct Observations	6
		Number of Missing Observations	332
Number of Detects	5	Number of Non-Detects	49
Number of Distinct Detects	3	Number of Distinct Non-Detects	4
Minimum Detect	0.002	Minimum Non-Detect	0.002
Maximum Detect	0.004	Maximum Non-Detect	0.008
Variance Detects	5.0000E-7	Percent Non-Detects	90.74%
Mean Detects	0.003	SD Detects	7.0711E-4
Median Detects	0.003	CV Detects	0.236
Skewness Detects	0	Kurtosis Detects	2
Mean of Logged Detects	-5.833	SD of Logged Detects	0.247

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.883	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.3	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00271	KM Standard Error of Mean	2.9574E-4
90KM SD	6.9985E-4	95% KM (BCA) UCL	N/A

95% KM (t) UCL	0.00321	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0032	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0036	95% KM Chebyshev UCL	0.004
97.5% KM Chebyshev UCL	0.00456	99% KM Chebyshev UCL	0.00566

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.53	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.679	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.329	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.357	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	21.39	k star (bias corrected MLE)	8.69
Theta hat (MLE)	1.4025E-4	Theta star (bias corrected MLE)	3.4524E-4
nu hat (MLE)	213.9	nu star (bias corrected)	86.9
Mean (detects)	0.003		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.002	Mean	0.00935
Maximum	0.01	Median	0.01
SD	0.00206	CV	0.22
k hat (MLE)	10.88	k star (bias corrected MLE)	10.29
Theta hat (MLE)	8.5937E-4	Theta star (bias corrected MLE)	9.0883E-4
nu hat (MLE)	1175	nu star (bias corrected)	1111
Adjusted Level of Significance (β)	0.0456		
Approximate Chi Square Value (N/A, α)	1035	Adjusted Chi Square Value (N/A, β)	1033
95% Gamma Approximate UCL	0.01	95% Gamma Adjusted UCL	0.0101

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00271	SD (KM)	6.9985E-4
Variance (KM)	4.8980E-7	SE of Mean (KM)	2.9574E-4
k hat (KM)	15.04	k star (KM)	14.22
nu hat (KM)	1625	nu star (KM)	1536
theta hat (KM)	1.8045E-4	theta star (KM)	1.9090E-4
80% gamma percentile (KM)	0.00329	90% gamma percentile (KM)	0.00367
95% gamma percentile (KM)	0.004	99% gamma percentile (KM)	0.00466

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (N/A, α)	1446	Adjusted Chi Square Value (N/A, β)	1443
95% KM Approximate Gamma UCL	0.00288	95% KM Adjusted Gamma UCL	0.00289

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.868	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.338	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.319	Detected Data Not Lognormal at 10% Significance Level

Detected Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00263	Mean in Log Scale	-5.997
SD in Original Scale	9.0149E-4	SD in Log Scale	0.342
95% t UCL (assumes normality of ROS data)	0.00284	95% Percentile Bootstrap UCL	0.00284

95% BCA Bootstrap UCL	0.00284	95% Bootstrap t UCL	0.00286
95% H-UCL (Log ROS)	0.00286		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.942	KM Geo Mean	0.00263
KM SD (logged)	0.254	95% Critical H Value (KM-Log)	1.718
KM Standard Error of Mean (logged)	0.107	95% H-UCL (KM -Log)	0.00288
KM SD (logged)	0.254	95% Critical H Value (KM-Log)	1.718
KM Standard Error of Mean (logged)	0.107		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.00271	Mean in Log Scale	-5.937
SD in Original Scale	5.9560E-4	SD in Log Scale	0.249
95% t UCL (Assumes normality)	0.00285	95% H-Stat UCL	0.00289

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00321

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dissolved Cadmium

General Statistics

Total Number of Observations	63	Number of Distinct Observations	53
		Number of Missing Observations	324
Minimum	0.042	Mean	0.11
Maximum	0.21	Median	0.103
SD	0.0373	Std. Error of Mean	0.0047
Coefficient of Variation	0.34	Skewness	0.75

Normal GOF Test

Shapiro Wilk Test Statistic	0.951	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	0.0286	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.0898	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.129	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.118	95% Adjusted-CLT UCL (Chen-1995)	0.118
		95% Modified-t UCL (Johnson-1978)	0.118

Gamma GOF Test

A-D Test Statistic	0.134	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.752	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.0458	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.112	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	9.039	k star (bias corrected MLE)	8.619
Theta hat (MLE)	0.0121	Theta star (bias corrected MLE)	0.0127

nu hat (MLE)	1139	nu star (bias corrected)	1086
MLE Mean (bias corrected)	0.11	MLE Sd (bias corrected)	0.0374
		Approximate Chi Square Value (0.05)	1010
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	1009

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.118	95% Adjusted Gamma UCL	0.118

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.986	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.878	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0489	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.102	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.17	Mean of logged Data	-2.266
Maximum of Logged Data	-1.561	SD of logged Data	0.342

Assuming Lognormal Distribution

95% H-UCL	0.119	90% Chebyshev (MVUE) UCL	0.124
95% Chebyshev (MVUE) UCL	0.131	97.5% Chebyshev (MVUE) UCL	0.14
99% Chebyshev (MVUE) UCL	0.158		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.118	95% BCA Bootstrap UCL	0.118
95% Standard Bootstrap UCL	0.118	95% Bootstrap-t UCL	0.118
95% Hall's Bootstrap UCL	0.118	95% Percentile Bootstrap UCL	0.118
90% Chebyshev(Mean, Sd) UCL	0.124	95% Chebyshev(Mean, Sd) UCL	0.13
97.5% Chebyshev(Mean, Sd) UCL	0.139	99% Chebyshev(Mean, Sd) UCL	0.157

Suggested UCL to Use

95% Student's-t UCL	0.118

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dissolved Chromium

General Statistics

Total Number of Observations	62	Number of Distinct Observations	52
		Number of Missing Observations	325
Number of Detects	60	Number of Non-Detects	2
Number of Distinct Detects	50	Number of Distinct Non-Detects	2
Minimum Detect	0.24	Minimum Non-Detect	0.04
Maximum Detect	3.63	Maximum Non-Detect	1.7
Variance Detects	0.281	Percent Non-Detects	3.226%
Mean Detects	1.078	SD Detects	0.53
Median Detects	0.95	CV Detects	0.492
Skewness Detects	2.165	Kurtosis Detects	8.284
Mean of Logged Detects	-0.0273	SD of Logged Detects	0.459

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.855	**Normal GOF Test on Detected Observations Only**	
1% Shapiro Wilk P Value	1.0752E-7	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.172	**Lilliefors GOF Test**	

1% Lilliefors Critical Value	0.132	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.059	KM Standard Error of Mean	0.0688
90KM SD	0.536	95% KM (BCA) UCL	1.174
95% KM (t) UCL	1.174	95% KM (Percentile Bootstrap) UCL	1.173
95% KM (z) UCL	1.172	95% KM Bootstrap t UCL	1.201
90% KM Chebyshev UCL	1.265	95% KM Chebyshev UCL	1.359
97.5% KM Chebyshev UCL	1.489	99% KM Chebyshev UCL	1.744

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.601	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.114	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.115	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	5.058	k star (bias corrected MLE)	4.816
Theta hat (MLE)	0.213	Theta star (bias corrected MLE)	0.224
nu hat (MLE)	607	nu star (bias corrected)	578
Mean (detects)	1.078		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.166	Mean	1.061
Maximum	3.63	Median	0.945
SD	0.534	CV	0.504
k hat (MLE)	4.493	k star (bias corrected MLE)	4.287
Theta hat (MLE)	0.236	Theta star (bias corrected MLE)	0.247
nu hat (MLE)	557.2	nu star (bias corrected)	531.6
Adjusted Level of Significance (β)	0.0461		
Approximate Chi Square Value (531.55, α)	479.1	Adjusted Chi Square Value (531.55, β)	477.9
95% Gamma Approximate UCL	1.177	95% Gamma Adjusted UCL	1.18

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.059	SD (KM)	0.536
Variance (KM)	0.287	SE of Mean (KM)	0.0688
k hat (KM)	3.909	k star (KM)	3.731
nu hat (KM)	484.7	nu star (KM)	462.6
theta hat (KM)	0.271	theta star (KM)	0.284
80% gamma percentile (KM)	1.472	90% gamma percentile (KM)	1.794
95% gamma percentile (KM)	2.091	99% gamma percentile (KM)	2.728

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (462.62, α)	413.8	Adjusted Chi Square Value (462.62, β)	412.7
95% KM Approximate Gamma UCL	1.184	95% KM Adjusted Gamma UCL	1.187

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.979	**Shapiro Wilk GOF Test**
10% Shapiro Wilk P Value	0.619	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0948	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.104	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.062	Mean in Log Scale	-0.0473
SD in Original Scale	0.531	SD in Log Scale	0.476
95% t UCL (assumes normality of ROS data)	1.175	95% Percentile Bootstrap UCL	1.17
95% BCA Bootstrap UCL	1.185	95% Bootstrap t UCL	1.198
95% H-UCL (Log ROS)	1.195		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.0808	KM Geo Mean	0.922
KM SD (logged)	0.606	95% Critical H Value (KM-Log)	1.935
KM Standard Error of Mean (logged)	0.0782	95% H-UCL (KM -Log)	1.288
KM SD (logged)	0.606	95% Critical H Value (KM-Log)	1.935
KM Standard Error of Mean (logged)	0.0782		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.057	Mean in Log Scale	-0.0921
SD in Original Scale	0.539	SD in Log Scale	0.669
95% t UCL (Assumes normality)	1.171	95% H-Stat UCL	1.352

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL	1.184	95% GROS Approximate Gamma UCL	1.177

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dissolved Copper

General Statistics

Total Number of Observations	63	Number of Distinct Observations	54
		Number of Missing Observations	324
Minimum	4.86	Mean	20.41
Maximum	41.8	Median	20.7
SD	7.348	Std. Error of Mean	0.926
Coefficient of Variation	0.36	Skewness	0.467

Normal GOF Test

Shapiro Wilk Test Statistic	0.96	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0.0957	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.125	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.129	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	21.95	95% Adjusted-CLT UCL (Chen-1995)	21.99
		95% Modified-t UCL (Johnson-1978)	21.96

Gamma GOF Test

A-D Test Statistic	1.059	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.106	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.112	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.941	k star (bias corrected MLE)	6.621
Theta hat (MLE)	2.94	Theta star (bias corrected MLE)	3.082
nu hat (MLE)	874.5	nu star (bias corrected)	834.2
MLE Mean (bias corrected)	20.41	MLE Sd (bias corrected)	7.931
		Approximate Chi Square Value (0.05)	768.2
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	766.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	22.16	95% Adjusted Gamma UCL	22.2

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.919	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	3.6023E-4	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.131	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.102	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.581	Mean of logged Data	2.942
Maximum of Logged Data	3.733	SD of logged Data	0.413

Assuming Lognormal Distribution

95% H-UCL	22.7	90% Chebyshev (MVUE) UCL	23.95
95% Chebyshev (MVUE) UCL	25.46	97.5% Chebyshev (MVUE) UCL	27.56
99% Chebyshev (MVUE) UCL	31.68		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	21.93	95% BCA Bootstrap UCL	21.99
95% Standard Bootstrap UCL	21.9	95% Bootstrap-t UCL	22
95% Hall's Bootstrap UCL	22.03	95% Percentile Bootstrap UCL	21.92
90% Chebyshev(Mean, Sd) UCL	23.19	95% Chebyshev(Mean, Sd) UCL	24.44
97.5% Chebyshev(Mean, Sd) UCL	26.19	99% Chebyshev(Mean, Sd) UCL	29.62

Suggested UCL to Use

95% Student's-t UCL	21.95

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dissolved Lead

General Statistics

Total Number of Observations	63	Number of Distinct Observations	61
		Number of Missing Observations	324
Minimum	0.177	Mean	0.718
Maximum	1.54	Median	0.667
SD	0.324	Std. Error of Mean	0.0408
Coefficient of Variation	0.451	Skewness	0.807

Normal GOF Test

Shapiro Wilk Test Statistic	0.931	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	0.00178	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.0955	**Lilliefors GOF Test**	

1% Lilliefors Critical Value	0.129	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.786	95% Adjusted-CLT UCL (Chen-1995)	0.789
		95% Modified-t UCL (Johnson-1978)	0.786

Gamma GOF Test

A-D Test Statistic	0.267	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.754	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0574	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.113	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.13	k star (bias corrected MLE)	4.896
Theta hat (MLE)	0.14	Theta star (bias corrected MLE)	0.147
nu hat (MLE)	646.3	nu star (bias corrected)	616.9
MLE Mean (bias corrected)	0.718	MLE Sd (bias corrected)	0.324
		Approximate Chi Square Value (0.05)	560.3
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	559

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.79	95% Adjusted Gamma UCL	0.792

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.98	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0.66	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0492	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.102	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.732	Mean of logged Data	-0.432
Maximum of Logged Data	0.432	SD of logged Data	0.46

Assuming Lognormal Distribution

95% H-UCL	0.803	90% Chebyshev (MVUE) UCL	0.851
95% Chebyshev (MVUE) UCL	0.91	97.5% Chebyshev (MVUE) UCL	0.993
99% Chebyshev (MVUE) UCL	1.154		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.785	95% BCA Bootstrap UCL	0.788
95% Standard Bootstrap UCL	0.784	95% Bootstrap-t UCL	0.791
95% Hall's Bootstrap UCL	0.791	95% Percentile Bootstrap UCL	0.786
90% Chebyshev(Mean, Sd) UCL	0.84	95% Chebyshev(Mean, Sd) UCL	0.895
97.5% Chebyshev(Mean, Sd) UCL	0.972	99% Chebyshev(Mean, Sd) UCL	1.124

Suggested UCL to Use

95% Student's-t UCL	0.786

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dissolved Mercury

General Statistics

Total Number of Observations	62	Number of Distinct Observations	59
		Number of Missing Observations	331
Number of Detects	61	Number of Non-Detects	1
Number of Distinct Detects	58	Number of Distinct Non-Detects	1
Minimum Detect	5.3000E-4	Minimum Non-Detect	0.00205
Maximum Detect	0.0894	Maximum Non-Detect	0.00205
Variance Detects	1.8079E-4	Percent Non-Detects	1.613%
Mean Detects	0.0143	SD Detects	0.0134
Median Detects	0.0107	CV Detects	0.942
Skewness Detects	3.424	Kurtosis Detects	16.37
Mean of Logged Detects	-4.568	SD of Logged Detects	0.848

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.705	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	7.772E-16	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.164	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.131	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0141	KM Standard Error of Mean	0.00171
90KM SD	0.0133	95% KM (BCA) UCL	0.0172
95% KM (t) UCL	0.0169	95% KM (Percentile Bootstrap) UCL	0.0171
95% KM (z) UCL	0.0169	95% KM Bootstrap t UCL	0.0184
90% KM Chebyshev UCL	0.0192	95% KM Chebyshev UCL	0.0215
97.5% KM Chebyshev UCL	0.0247	99% KM Chebyshev UCL	0.031

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.617	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.766	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0793	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.116	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.72	k star (bias corrected MLE)	1.647
Theta hat (MLE)	0.0083	Theta star (bias corrected MLE)	0.00867
nu hat (MLE)	209.9	nu star (bias corrected)	200.9
Mean (detects)	0.0143		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	5.3000E-4	Mean	0.0142
Maximum	0.0894	Median	0.0107
SD	0.0133	CV	0.94
k hat (MLE)	1.742	k star (bias corrected MLE)	1.668
Theta hat (MLE)	0.00815	Theta star (bias corrected MLE)	0.00851
nu hat (MLE)	216	nu star (bias corrected)	206.9
Adjusted Level of Significance (β)	0.0461		
Approximate Chi Square Value (206.86, α)	174.6	Adjusted Chi Square Value (206.86, β)	173.9
95% Gamma Approximate UCL	0.0168	95% Gamma Adjusted UCL	0.0169

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0141	SD (KM)	0.0133
Variance (KM)	1.7786E-4	SE of Mean (KM)	0.00171
k hat (KM)	1.11	k star (KM)	1.067
nu hat (KM)	137.7	nu star (KM)	132.3
theta hat (KM)	0.0127	theta star (KM)	0.0132
80% gamma percentile (KM)	0.0225	90% gamma percentile (KM)	0.0318
95% gamma percentile (KM)	0.0411	99% gamma percentile (KM)	0.0626

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (132.35, α)	106.8	Adjusted Chi Square Value (132.35, β)	106.2
95% KM Approximate Gamma UCL	0.0174	95% KM Adjusted Gamma UCL	0.0175

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.959	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk P Value	0.0945	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.0919	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.104	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Approximate Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0141	Mean in Log Scale	-4.596
SD in Original Scale	0.0134	SD in Log Scale	0.87
95% t UCL (assumes normality of ROS data)	0.0169	95% Percentile Bootstrap UCL	0.0169
95% BCA Bootstrap UCL	0.0175	95% Bootstrap t UCL	0.0184
95% H-UCL (Log ROS)	0.0187		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.611	KM Geo Mean	0.00994
KM SD (logged)	0.9	95% Critical H Value (KM-Log)	2.18
KM Standard Error of Mean (logged)	0.115	95% H-UCL (KM -Log)	0.0192
KM SD (logged)	0.9	95% Critical H Value (KM-Log)	2.18
KM Standard Error of Mean (logged)	0.115		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0141	Mean in Log Scale	-4.605
SD in Original Scale	0.0134	SD in Log Scale	0.891
95% t UCL (Assumes normality)	0.0169	95% H-Stat UCL	0.019

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM Approximate Gamma UCL	0.0174	95% GROS Approximate Gamma UCL	0.0168

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dissolved Molybdenum

General Statistics

Total Number of Observations	54	Number of Distinct Observations	46
		Number of Missing Observations	332
Minimum	1.33	Mean	4.002
Maximum	47.6	Median	2.91

SD	6.237	Std. Error of Mean	0.849
Coefficient of Variation	1.558	Skewness	6.68

Normal GOF Test

Shapiro Wilk Test Statistic	0.329	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.334	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.139	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.423	95% Adjusted-CLT UCL (Chen-1995)	6.222
		95% Modified-t UCL (Johnson-1978)	5.551

Gamma GOF Test

A-D Test Statistic	3.299	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.764	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.168	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.123	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.882	k star (bias corrected MLE)	1.789
Theta hat (MLE)	2.127	Theta star (bias corrected MLE)	2.236
nu hat (MLE)	203.2	nu star (bias corrected)	193.2
MLE Mean (bias corrected)	4.002	MLE Sd (bias corrected)	2.992
		Approximate Chi Square Value (0.05)	162.1
Adjusted Level of Significance	0.0456	Adjusted Chi Square Value	161.3

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.771	95% Adjusted Gamma UCL	4.794

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.873	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	5.1128E-6	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0977	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.11	Data appear Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.285	Mean of logged Data	1.098
Maximum of Logged Data	3.863	SD of logged Data	0.605

Assuming Lognormal Distribution

95% H-UCL	4.237	90% Chebyshev (MVUE) UCL	4.538
95% Chebyshev (MVUE) UCL	4.969	97.5% Chebyshev (MVUE) UCL	5.567
99% Chebyshev (MVUE) UCL	6.741		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	5.398	95% BCA Bootstrap UCL	6.586
95% Standard Bootstrap UCL	5.349	95% Bootstrap-t UCL	8.719
95% Hall's Bootstrap UCL	10.83	95% Percentile Bootstrap UCL	5.586
90% Chebyshev(Mean, Sd) UCL	6.548	95% Chebyshev(Mean, Sd) UCL	7.701
97.5% Chebyshev(Mean, Sd) UCL	9.302	99% Chebyshev(Mean, Sd) UCL	12.45

Suggested UCL to Use

95% H-UCL	4.237

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dissolved Nickel

General Statistics

Total Number of Observations	63	Number of Distinct Observations	56
		Number of Missing Observations	324
Minimum	0.136	Mean	3.941
Maximum	9.49	Median	4.24
SD	1.489	Std. Error of Mean	0.188
Coefficient of Variation	0.378	Skewness	-0.198

Normal GOF Test

Shapiro Wilk Test Statistic	0.873	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	5.1158E-7	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.194	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.129	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.254	95% Adjusted-CLT UCL (Chen-1995)	4.245
		95% Modified-t UCL (Johnson-1978)	4.253

Gamma GOF Test

A-D Test Statistic	6.775	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.755	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.294	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.681	k star (bias corrected MLE)	3.517
Theta hat (MLE)	1.071	Theta star (bias corrected MLE)	1.121
nu hat (MLE)	463.8	nu star (bias corrected)	443.1
MLE Mean (bias corrected)	3.941	MLE Sd (bias corrected)	2.102
		Approximate Chi Square Value (0.05)	395.3
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	394.2

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.418	95% Adjusted Gamma UCL	4.429

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.651	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.329	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.102	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.995	Mean of logged Data	1.23
Maximum of Logged Data	2.25	SD of logged Data	0.69

Assuming Lognormal Distribution

95% H-UCL	5.172	90% Chebyshev (MVUE) UCL	5.555
95% Chebyshev (MVUE) UCL	6.115	97.5% Chebyshev (MVUE) UCL	6.892
99% Chebyshev (MVUE) UCL	8.417		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	4.25	95% BCA Bootstrap UCL	4.247
95% Standard Bootstrap UCL	4.244	95% Bootstrap-t UCL	4.251
95% Hall's Bootstrap UCL	4.271	95% Percentile Bootstrap UCL	4.245
90% Chebyshev(Mean, Sd) UCL	4.504	95% Chebyshev(Mean, Sd) UCL	4.759
97.5% Chebyshev(Mean, Sd) UCL	5.112	99% Chebyshev(Mean, Sd) UCL	5.807

Suggested UCL to Use

95% Student's-t UCL	4.254

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Dissolved Selenium

General Statistics

Total Number of Observations	55	Number of Distinct Observations	8
		Number of Missing Observations	331
Minimum	0.136	Mean	0.65
Maximum	1	Median	0.6
SD	0.157	Std. Error of Mean	0.0212
Coefficient of Variation	0.242	Skewness	-0.229

Normal GOF Test

Shapiro Wilk Test Statistic	0.945	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	0.0253	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.151	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.138	Data Not Normal at 1% Significance Level	

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.685	95% Adjusted-CLT UCL (Chen-1995)	0.684
		95% Modified-t UCL (Johnson-1978)	0.685

Gamma GOF Test

A-D Test Statistic	1.489	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.75	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.165	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.12	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	13.86	k star (bias corrected MLE)	13.12

Theta hat (MLE)	0.0469	Theta star (bias corrected MLE)	0.0495
nu hat (MLE)	1525	nu star (bias corrected)	1443
MLE Mean (bias corrected)	0.65	MLE Sd (bias corrected)	0.179
		Approximate Chi Square Value (0.05)	1356
Adjusted Level of Significance	0.0456	Adjusted Chi Square Value	1353

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.692	95% Adjusted Gamma UCL	0.693

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.812	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	4.0626E-9	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.188	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.109	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.995	Mean of logged Data	-0.468
Maximum of Logged Data	0	SD of logged Data	0.3

Assuming Lognormal Distribution

95% H-UCL	0.702	90% Chebyshev (MVUE) UCL	0.736
95% Chebyshev (MVUE) UCL	0.772	97.5% Chebyshev (MVUE) UCL	0.823
99% Chebyshev (MVUE) UCL	0.923		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.685	95% BCA Bootstrap UCL	0.684
95% Standard Bootstrap UCL	0.684	95% Bootstrap-t UCL	0.685
95% Hall's Bootstrap UCL	0.685	95% Percentile Bootstrap UCL	0.684
90% Chebyshev(Mean, Sd) UCL	0.713	95% Chebyshev(Mean, Sd) UCL	0.742
97.5% Chebyshev(Mean, Sd) UCL	0.782	99% Chebyshev(Mean, Sd) UCL	0.861

Suggested UCL to Use

95% Student's-t UCL	0.685

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Dissolved Silver

General Statistics

Total Number of Observations	63	Number of Distinct Observations	56
		Number of Missing Observations	324
Number of Detects	59	Number of Non-Detects	4
Number of Distinct Detects	52	Number of Distinct Non-Detects	4
Minimum Detect	0.023	Minimum Non-Detect	0.017
Maximum Detect	0.422	Maximum Non-Detect	0.05
Variance Detects	0.00836	Percent Non-Detects	6.349%
Mean Detects	0.109	SD Detects	0.0915
Median Detects	0.07	CV Detects	0.841

Skewness Detects	1.57	Kurtosis Detects	2.093
Mean of Logged Detects	-2.516	SD of Logged Detects	0.765

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.807	**Normal GOF Test on Detected Observations Only**
1% Shapiro Wilk P Value	3.629E-10	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.217	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.133	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.103	KM Standard Error of Mean	0.0115
90KM SD	0.0904	95% KM (BCA) UCL	0.122
95% KM (t) UCL	0.122	95% KM (Percentile Bootstrap) UCL	0.122
95% KM (z) UCL	0.122	95% KM Bootstrap t UCL	0.126
90% KM Chebyshev UCL	0.138	95% KM Chebyshev UCL	0.153
97.5% KM Chebyshev UCL	0.175	99% KM Chebyshev UCL	0.217

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.418	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.765	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.144	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.117	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.829	k star (bias corrected MLE)	1.748
Theta hat (MLE)	0.0595	Theta star (bias corrected MLE)	0.0622
nu hat (MLE)	215.9	nu star (bias corrected)	206.2
Mean (detects)	0.109		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.103
Maximum	0.422	Median	0.065
SD	0.0916	CV	0.893
k hat (MLE)	1.517	k star (bias corrected MLE)	1.455
Theta hat (MLE)	0.0676	Theta star (bias corrected MLE)	0.0705
nu hat (MLE)	191.2	nu star (bias corrected)	183.4
Adjusted Level of Significance (β)	0.0462		
Approximate Chi Square Value (183.38, α)	153.1	Adjusted Chi Square Value (183.38, β)	152.4
95% Gamma Approximate UCL	0.123	95% Gamma Adjusted UCL	0.123

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.103	SD (KM)	0.0904
Variance (KM)	0.00816	SE of Mean (KM)	0.0115
k hat (KM)	1.304	k star (KM)	1.253
nu hat (KM)	164.3	nu star (KM)	157.8
theta hat (KM)	0.0791	theta star (KM)	0.0824
80% gamma percentile (KM)	0.163	90% gamma percentile (KM)	0.225
95% gamma percentile (KM)	0.286	99% gamma percentile (KM)	0.425

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (157.85, α)	129.8	Adjusted Chi Square Value (157.85, β)	129.2
95% KM Approximate Gamma UCL	0.125	95% KM Adjusted Gamma UCL	0.126

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Approximate Test Statistic	0.951	**Shapiro Wilk GOF Test**
10% Shapiro Wilk P Value	0.0386	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.103	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.105	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Approximate Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.103	Mean in Log Scale	-2.617
SD in Original Scale	0.0913	SD in Log Scale	0.843
95% t UCL (assumes normality of ROS data)	0.122	95% Percentile Bootstrap UCL	0.122
95% BCA Bootstrap UCL	0.123	95% Bootstrap t UCL	0.126
95% H-UCL (Log ROS)	0.131		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.606	KM Geo Mean	0.0739
KM SD (logged)	0.814	95% Critical H Value (KM-Log)	2.104
KM Standard Error of Mean (logged)	0.104	95% H-UCL (KM -Log)	0.128
KM SD (logged)	0.814	95% Critical H Value (KM-Log)	2.104
KM Standard Error of Mean (logged)	0.104		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.103	Mean in Log Scale	-2.638
SD in Original Scale	0.0915	SD in Log Scale	0.884
95% t UCL (Assumes normality)	0.122	95% H-Stat UCL	0.135

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 10% Significance Level

Suggested UCL to Use

KM H-UCL 0.128

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dissolved Thallium

General Statistics

Total Number of Observations	54	Number of Distinct Observations	7
		Number of Missing Observations	332
Number of Detects	4	Number of Non-Detects	50
Number of Distinct Detects	4	Number of Distinct Non-Detects	3
Minimum Detect	0.013	Minimum Non-Detect	0.002
Maximum Detect	0.032	Maximum Non-Detect	0.009
Variance Detects	7.2917E-5	Percent Non-Detects	92.59%
Mean Detects	0.0213	SD Detects	0.00854
Median Detects	0.02	CV Detects	0.402
Skewness Detects	0.596	Kurtosis Detects	-1.711
Mean of Logged Detects	-3.912	SD of Logged Detects	0.404

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.948	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.687	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.231	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.413	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00343	KM Standard Error of Mean	8.5298E-4
90KM SD	0.00543	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.00485	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.00483	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.00598	95% KM Chebyshev UCL	0.00714
97.5% KM Chebyshev UCL	0.00875	99% KM Chebyshev UCL	0.0119

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.261	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.658	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.247	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.395	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	8.357	k star (bias corrected MLE)	2.256
Theta hat (MLE)	0.00254	Theta star (bias corrected MLE)	0.00942
nu hat (MLE)	66.85	nu star (bias corrected)	18.05
Mean (detects)	0.0213		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0108
Maximum	0.032	Median	0.01
SD	0.0036	CV	0.332
k hat (MLE)	17.57	k star (bias corrected MLE)	16.61
Theta hat (MLE)	6.1660E-4	Theta star (bias corrected MLE)	6.5238E-4
nu hat (MLE)	1898	nu star (bias corrected)	1793
Adjusted Level of Significance (β)	0.0456		
Approximate Chi Square Value (N/A, α)	1696	Adjusted Chi Square Value (N/A, β)	1693
95% Gamma Approximate UCL	0.0115	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00343	SD (KM)	0.00543
Variance (KM)	2.9467E-5	SE of Mean (KM)	8.5298E-4
k hat (KM)	0.398	k star (KM)	0.389
nu hat (KM)	43.02	nu star (KM)	41.96
theta hat (KM)	0.0086	theta star (KM)	0.00882
80% gamma percentile (KM)	0.00551	90% gamma percentile (KM)	0.00973
95% gamma percentile (KM)	0.0144	99% gamma percentile (KM)	0.0261

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (41.96, α)	28.11	Adjusted Chi Square Value (41.96, β)	27.8
95% KM Approximate Gamma UCL	0.00511	95% KM Adjusted Gamma UCL	0.00517

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.964	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.792	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.209	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.346	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00329	Mean in Log Scale	-6.64
SD in Original Scale	0.00582	SD in Log Scale	1.364
95% t UCL (assumes normality of ROS data)	0.00462	95% Percentile Bootstrap UCL	0.00469
95% BCA Bootstrap UCL	0.00499	95% Bootstrap t UCL	0.00547
95% H-UCL (Log ROS)	0.00562		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.044	KM Geo Mean	0.00237
KM SD (logged)	0.61	95% Critical H Value (KM-Log)	1.959
KM Standard Error of Mean (logged)	0.0959	95% H-UCL (KM -Log)	0.00337
KM SD (logged)	0.61	95% Critical H Value (KM-Log)	1.959
KM Standard Error of Mean (logged)	0.0959		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00474	Mean in Log Scale	-5.705
SD in Original Scale	0.00534	SD in Log Scale	0.828
95% t UCL (Assumes normality)	0.00596	95% H-Stat UCL	0.00598

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00485

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dissolved Zinc

General Statistics

Total Number of Observations	63	Number of Distinct Observations	61
		Number of Missing Observations	324
Minimum	16.8	Mean	65.66
Maximum	124	Median	66
SD	18.71	Std. Error of Mean	2.358
Coefficient of Variation	0.285	Skewness	0.204

Normal GOF Test

Shapiro Wilk Test Statistic	0.974	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	0.432	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.0995	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.129	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	69.6	95% Adjusted-CLT UCL (Chen-1995)	69.6
		95% Modified-t UCL (Johnson-1978)	69.61

Gamma GOF Test

A-D Test Statistic	1.268	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.751	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.119	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.112	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	10.9	k star (bias corrected MLE)	10.39
Theta hat (MLE)	6.023	Theta star (bias corrected MLE)	6.318
nu hat (MLE)	1373	nu star (bias corrected)	1309
MLE Mean (bias corrected)	65.66	MLE Sd (bias corrected)	20.37
		Approximate Chi Square Value (0.05)	1226
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	1225

Assuming Gamma Distribution

95% Approximate Gamma UCL	70.1	95% Adjusted Gamma UCL	70.21

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	1.4516E-4	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.142	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.102	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.821	Mean of logged Data	4.138
Maximum of Logged Data	4.82	SD of logged Data	0.327

Assuming Lognormal Distribution

95% H-UCL	71.16	90% Chebyshev (MVUE) UCL	74.42
95% Chebyshev (MVUE) UCL	78.21	97.5% Chebyshev (MVUE) UCL	83.47
99% Chebyshev (MVUE) UCL	93.79		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	69.54	95% BCA Bootstrap UCL	69.57
95% Standard Bootstrap UCL	69.52	95% Bootstrap-t UCL	69.74
95% Hall's Bootstrap UCL	69.83	95% Percentile Bootstrap UCL	69.53
90% Chebyshev(Mean, Sd) UCL	72.73	95% Chebyshev(Mean, Sd) UCL	75.94
97.5% Chebyshev(Mean, Sd) UCL	80.38	99% Chebyshev(Mean, Sd) UCL	89.12

Suggested UCL to Use

95% Student's-t UCL	69.6

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Endosulfan Sulfate

General Statistics

Total Number of Observations	18	Number of Distinct Observations	16
		Number of Missing Observations	386
Number of Detects	1	Number of Non-Detects	17
Number of Distinct Detects	1	Number of Distinct Non-Detects	15

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Endosulfan Sulfate was not processed!

Endrin Ketone

General Statistics

Total Number of Observations	18	Number of Distinct Observations	13
		Number of Missing Observations	386
Number of Detects	1	Number of Non-Detects	17
Number of Distinct Detects	1	Number of Distinct Non-Detects	12

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Endrin Ketone was not processed!

Ethylbenzene

General Statistics

Total Number of Observations	25	Number of Distinct Observations	23
		Number of Missing Observations	402
Number of Detects	23	Number of Non-Detects	2
Number of Distinct Detects	22	Number of Distinct Non-Detects	1
Minimum Detect	0.08	Minimum Non-Detect	1.05
Maximum Detect	1.5	Maximum Non-Detect	1.05
Variance Detects	0.15	Percent Non-Detects	8%
Mean Detects	0.501	SD Detects	0.388
Median Detects	0.44	CV Detects	0.773
Skewness Detects	1.529	Kurtosis Detects	1.809
Mean of Logged Detects	-0.949	SD of Logged Detects	0.744

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.818	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.209	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.491	KM Standard Error of Mean	0.0763
90KM SD	0.369	95% KM (BCA) UCL	0.619
95% KM (t) UCL	0.621	95% KM (Percentile Bootstrap) UCL	0.618
95% KM (z) UCL	0.616	95% KM Bootstrap t UCL	0.669
90% KM Chebyshev UCL	0.72	95% KM Chebyshev UCL	0.823
97.5% KM Chebyshev UCL	0.967	99% KM Chebyshev UCL	1.25

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.438	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.754	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.11	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.184	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.083	k star (bias corrected MLE)	1.841
Theta hat (MLE)	0.241	Theta star (bias corrected MLE)	0.272
nu hat (MLE)	95.83	nu star (bias corrected)	84.66
Mean (detects)	0.501		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.08	Mean	0.491
Maximum	1.5	Median	0.44
SD	0.375	CV	0.764
k hat (MLE)	2.181	k star (bias corrected MLE)	1.946
Theta hat (MLE)	0.225	Theta star (bias corrected MLE)	0.252
nu hat (MLE)	109.1	nu star (bias corrected)	97.3
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (97.30, α)	75.55	Adjusted Chi Square Value (97.30, β)	74.24
95% Gamma Approximate UCL	0.632	95% Gamma Adjusted UCL	0.643

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.491	SD (KM)	0.369
Variance (KM)	0.136	SE of Mean (KM)	0.0763
k hat (KM)	1.77	k star (KM)	1.584
nu hat (KM)	88.51	nu star (KM)	79.22
theta hat (KM)	0.277	theta star (KM)	0.31
80% gamma percentile (KM)	0.755	90% gamma percentile (KM)	1.009
95% gamma percentile (KM)	1.256	99% gamma percentile (KM)	1.81

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (79.22, α)	59.71	Adjusted Chi Square Value (79.22, β)	58.56
95% KM Approximate Gamma UCL	0.651	95% KM Adjusted Gamma UCL	0.664

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.971	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.928	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0913	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.165	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.489	Mean in Log Scale	-0.961
SD in Original Scale	0.375	SD in Log Scale	0.719
95% t UCL (assumes normality of ROS data)	0.617	95% Percentile Bootstrap UCL	0.613
95% BCA Bootstrap UCL	0.637	95% Bootstrap t UCL	0.667
95% H-UCL (Log ROS)	0.68		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.964	KM Geo Mean	0.381
KM SD (logged)	0.719	95% Critical H Value (KM-Log)	2.165
KM Standard Error of Mean (logged)	0.151	95% H-UCL (KM -Log)	0.678
KM SD (logged)	0.719	95% Critical H Value (KM-Log)	2.165
KM Standard Error of Mean (logged)	0.151		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.503	Mean in Log Scale	-0.925
SD in Original Scale	0.371	SD in Log Scale	0.717
95% t UCL (Assumes normality)	0.63	95% H-Stat UCL	0.704

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.621

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Fluoranthene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	22
		Number of Missing Observations	381
Number of Detects	11	Number of Non-Detects	16
Number of Distinct Detects	11	Number of Distinct Non-Detects	11
Minimum Detect	0.112	Minimum Non-Detect	0.45
Maximum Detect	0.317	Maximum Non-Detect	140
Variance Detects	0.00429	Percent Non-Detects	59.26%
Mean Detects	0.185	SD Detects	0.0655
Median Detects	0.164	CV Detects	0.354
Skewness Detects	0.891	Kurtosis Detects	-0.183
Mean of Logged Detects	-1.742	SD of Logged Detects	0.336

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.895	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.792	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.215	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.291	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.185	KM Standard Error of Mean	0.0197
90KM SD	0.0624	95% KM (BCA) UCL	0.219
95% KM (t) UCL	0.218	95% KM (Percentile Bootstrap) UCL	0.219
95% KM (z) UCL	0.217	95% KM Bootstrap t UCL	0.23
90% KM Chebyshev UCL	0.244	95% KM Chebyshev UCL	0.271
97.5% KM Chebyshev UCL	0.308	99% KM Chebyshev UCL	0.381

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.443	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.73	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.182	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.255	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	9.572	k star (bias corrected MLE)	7.022
Theta hat (MLE)	0.0193	Theta star (bias corrected MLE)	0.0263
nu hat (MLE)	210.6	nu star (bias corrected)	154.5
Mean (detects)	0.185		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.112	Mean	0.182
Maximum	0.317	Median	0.18
SD	0.0458	CV	0.251

k hat (MLE)	17.85	k star (bias corrected MLE)	15.89
Theta hat (MLE)	0.0102	Theta star (bias corrected MLE)	0.0115
nu hat (MLE)	963.7	nu star (bias corrected)	857.9
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (857.94, α)	791	Adjusted Chi Square Value (857.94, β)	786.9
95% Gamma Approximate UCL	0.198	95% Gamma Adjusted UCL	0.199

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.185	SD (KM)	0.0624
Variance (KM)	0.0039	SE of Mean (KM)	0.0197
k hat (KM)	8.757	k star (KM)	7.808
nu hat (KM)	472.9	nu star (KM)	421.7
theta hat (KM)	0.0211	theta star (KM)	0.0237
80% gamma percentile (KM)	0.237	90% gamma percentile (KM)	0.273
95% gamma percentile (KM)	0.305	99% gamma percentile (KM)	0.372

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (421.66, α)	375.1	Adjusted Chi Square Value (421.66, β)	372.3
95% KM Approximate Gamma UCL	0.208	95% KM Adjusted Gamma UCL	0.209

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.934	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.876	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.16	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.231	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.18	Mean in Log Scale	-1.742
SD in Original Scale	0.0451	SD in Log Scale	0.235
95% t UCL (assumes normality of ROS data)	0.195	95% Percentile Bootstrap UCL	0.195
95% BCA Bootstrap UCL	0.198	95% Bootstrap t UCL	0.199
95% H-UCL (Log ROS)	0.196		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.742	KM Geo Mean	0.175
KM SD (logged)	0.321	95% Critical H Value (KM-Log)	1.834
KM Standard Error of Mean (logged)	0.101	95% H-UCL (KM -Log)	0.207
KM SD (logged)	0.321	95% Critical H Value (KM-Log)	1.834
KM Standard Error of Mean (logged)	0.101		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.817	Mean in Log Scale	-0.691
SD in Original Scale	13.54	SD in Log Scale	1.569
95% t UCL (Assumes normality)	8.262	95% H-Stat UCL	4.797

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.218

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Fluorene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	22
		Number of Missing Observations	381
Number of Detects	9	Number of Non-Detects	18
Number of Distinct Detects	9	Number of Distinct Non-Detects	13
Minimum Detect	0.0455	Minimum Non-Detect	0.14
Maximum Detect	0.126	Maximum Non-Detect	84
Variance Detects	6.1954E-4	Percent Non-Detects	66.67%
Mean Detects	0.0828	SD Detects	0.0249
Median Detects	0.078	CV Detects	0.301
Skewness Detects	0.313	Kurtosis Detects	-0.338
Mean of Logged Detects	-2.533	SD of Logged Detects	0.312

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.979	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.132	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0828	KM Standard Error of Mean	0.0083
90KM SD	0.0235	95% KM (BCA) UCL	0.0957
95% KM (t) UCL	0.097	95% KM (Percentile Bootstrap) UCL	0.0961
95% KM (z) UCL	0.0964	95% KM Bootstrap t UCL	0.1
90% KM Chebyshev UCL	0.108	95% KM Chebyshev UCL	0.119
97.5% KM Chebyshev UCL	0.135	99% KM Chebyshev UCL	0.165

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.171	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.133	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	12.11	k star (bias corrected MLE)	8.149
Theta hat (MLE)	0.00684	Theta star (bias corrected MLE)	0.0102
nu hat (MLE)	218	nu star (bias corrected)	146.7
Mean (detects)	0.0828		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0455	Mean	0.0819
Maximum	0.126	Median	0.0811
SD	0.0162	CV	0.197
k hat (MLE)	26.34	k star (bias corrected MLE)	23.44
Theta hat (MLE)	0.00311	Theta star (bias corrected MLE)	0.00349
nu hat (MLE)	1422	nu star (bias corrected)	1266
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (N/A, α)	1184	Adjusted Chi Square Value (N/A, β)	1179

95% Gamma Approximate UCL	0.0875	95% Gamma Adjusted UCL	0.0879

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0828	SD (KM)	0.0235
Variance (KM)	5.5070E-4	SE of Mean (KM)	0.0083
k hat (KM)	12.45	k star (KM)	11.09
nu hat (KM)	672.3	nu star (KM)	598.9
theta hat (KM)	0.00665	theta star (KM)	0.00747
80% gamma percentile (KM)	0.103	90% gamma percentile (KM)	0.116
95% gamma percentile (KM)	0.127	99% gamma percentile (KM)	0.151

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (598.93, α)	543.2	Adjusted Chi Square Value (598.93, β)	539.8
95% KM Approximate Gamma UCL	0.0913	95% KM Adjusted Gamma UCL	0.0919

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.978	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.133	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.081	Mean in Log Scale	-2.533
SD in Original Scale	0.0162	SD in Log Scale	0.202
95% t UCL (assumes normality of ROS data)	0.0863	95% Percentile Bootstrap UCL	0.0862
95% BCA Bootstrap UCL	0.0863	95% Bootstrap t UCL	0.0867
95% H-UCL (Log ROS)	0.0869		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.533	KM Geo Mean	0.0794
KM SD (logged)	0.294	95% Critical H Value (KM-Log)	1.816
KM Standard Error of Mean (logged)	0.104	95% H-UCL (KM -Log)	0.0921
KM SD (logged)	0.294	95% Critical H Value (KM-Log)	1.816
KM Standard Error of Mean (logged)	0.104		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.256	Mean in Log Scale	-1.378
SD in Original Scale	8.135	SD in Log Scale	1.641
95% t UCL (Assumes normality)	4.927	95% H-Stat UCL	2.944

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.097

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Heptachlor

General Statistics

Total Number of Observations	18	Number of Distinct Observations	14

		Number of Missing Observations	386
Number of Detects	1	Number of Non-Detects	17
Number of Distinct Detects	1	Number of Distinct Non-Detects	13

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Heptachlor was not processed!

Indeno(1,2,3-c,d)pyrene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	18
		Number of Missing Observations	381
Number of Detects	3	Number of Non-Detects	24
Number of Distinct Detects	3	Number of Distinct Non-Detects	15
Minimum Detect	0.00566	Minimum Non-Detect	0.00139
Maximum Detect	0.0444	Maximum Non-Detect	170
Variance Detects	3.7824E-4	Percent Non-Detects	88.89%
Mean Detects	0.0259	SD Detects	0.0194
Median Detects	0.0277	CV Detects	0.75
Skewness Detects	-0.4	Kurtosis Detects	N/A
Mean of Logged Detects	-3.959	SD of Logged Detects	1.079

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.994	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00957	KM Standard Error of Mean	0.00602
90KM SD	0.0148	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0198	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0195	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0276	95% KM Chebyshev UCL	0.0358
97.5% KM Chebyshev UCL	0.0472	99% KM Chebyshev UCL	0.0695

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.326	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.637	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.299	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.436	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.783	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0145	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	10.7	nu star (bias corrected)	N/A
Mean (detects)	0.0259		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00566	Mean	0.0118
Maximum	0.0444	Median	0.01
SD	0.00742	CV	0.631
k hat (MLE)	5.654	k star (bias corrected MLE)	5.05
Theta hat (MLE)	0.00208	Theta star (bias corrected MLE)	0.00233
nu hat (MLE)	305.3	nu star (bias corrected)	272.7
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (272.73, α)	235.5	Adjusted Chi Square Value (272.73, β)	233.3
95% Gamma Approximate UCL	0.0136	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00957	SD (KM)	0.0148
Variance (KM)	2.1775E-4	SE of Mean (KM)	0.00602
k hat (KM)	0.42	k star (KM)	0.398
nu hat (KM)	22.69	nu star (KM)	21.51
theta hat (KM)	0.0228	theta star (KM)	0.024
80% gamma percentile (KM)	0.0154	90% gamma percentile (KM)	0.027
95% gamma percentile (KM)	0.0398	99% gamma percentile (KM)	0.0719

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (21.51, α)	11.97	Adjusted Chi Square Value (21.51, β)	11.51
95% KM Approximate Gamma UCL	0.0172	95% KM Adjusted Gamma UCL	0.0179

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.301	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00417	Mean in Log Scale	-6.75
SD in Original Scale	0.00965	SD in Log Scale	1.515
95% t UCL (assumes normality of ROS data)	0.00733	95% Percentile Bootstrap UCL	0.00756
95% BCA Bootstrap UCL	0.00915	95% Bootstrap t UCL	0.0191
95% H-UCL (Log ROS)	0.00973		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.705	KM Geo Mean	0.00333
KM SD (logged)	1.336	95% Critical H Value (KM-Log)	2.989
KM Standard Error of Mean (logged)	0.545	95% H-UCL (KM -Log)	0.0178
KM SD (logged)	1.336	95% Critical H Value (KM-Log)	2.989
KM Standard Error of Mean (logged)	0.545		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	4.757	Mean in Log Scale	-1.97
SD in Original Scale	16.43	SD in Log Scale	3.517
95% t UCL (Assumes normality)	10.15	95% H-Stat UCL	6665

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0198

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Isophorone

General Statistics

Total Number of Observations	18	Number of Distinct Observations	12
		Number of Missing Observations	390
Number of Detects	1	Number of Non-Detects	17
Number of Distinct Detects	1	Number of Distinct Non-Detects	12

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Isophorone was not processed!

Lead

General Statistics

Total Number of Observations	62	Number of Distinct Observations	47
		Number of Missing Observations	361
Minimum	0.782	Mean	1.802
Maximum	4.8	Median	1.66
SD	0.662	Std. Error of Mean	0.084
Coefficient of Variation	0.367	Skewness	2.952

Normal GOF Test

Shapiro Wilk Test Statistic	0.712	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	7.772E-16	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.22	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.13	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	1.942	95% Adjusted-CLT UCL (Chen-1995)	1.974
		95% Modified-t UCL (Johnson-1978)	1.948

Gamma GOF Test

A-D Test Statistic	2.695	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.751	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.168	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	10.84	k star (bias corrected MLE)	10.33
Theta hat (MLE)	0.166	Theta star (bias corrected MLE)	0.175
nu hat (MLE)	1344	nu star (bias corrected)	1280
MLE Mean (bias corrected)	1.802	MLE Sd (bias corrected)	0.561
		Approximate Chi Square Value (0.05)	1198
Adjusted Level of Significance	0.0461	Adjusted Chi Square Value	1196

Assuming Gamma Distribution

95% Approximate Gamma UCL	1.925	95% Adjusted Gamma UCL	1.928

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.904	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	4.8077E-5	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.142	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.103	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.246	Mean of logged Data	0.542
Maximum of Logged Data	1.569	SD of logged Data	0.29

Assuming Lognormal Distribution

95% H-UCL	1.913	90% Chebyshev (MVUE) UCL	1.993
95% Chebyshev (MVUE) UCL	2.084	97.5% Chebyshev (MVUE) UCL	2.211
99% Chebyshev (MVUE) UCL	2.459		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.94	95% BCA Bootstrap UCL	1.976
95% Standard Bootstrap UCL	1.939	95% Bootstrap-t UCL	1.991
95% Hall's Bootstrap UCL	2.025	95% Percentile Bootstrap UCL	1.949
90% Chebyshev(Mean, Sd) UCL	2.054	95% Chebyshev(Mean, Sd) UCL	2.168
97.5% Chebyshev(Mean, Sd) UCL	2.327	99% Chebyshev(Mean, Sd) UCL	2.638

Suggested UCL to Use

95% Student's-t UCL	1.942

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

m,p-Xylenes

General Statistics

Total Number of Observations	25	Number of Distinct Observations	23
		Number of Missing Observations	402
Number of Detects	22	Number of Non-Detects	3
Number of Distinct Detects	20	Number of Distinct Non-Detects	3
Minimum Detect	0.21	Minimum Non-Detect	0.14
Maximum Detect	6.2	Maximum Non-Detect	1.55
Variance Detects	2.334	Percent Non-Detects	12%
Mean Detects	1.87	SD Detects	1.528
Median Detects	1.6	CV Detects	0.817
Skewness Detects	1.573	Kurtosis Detects	2.441
Mean of Logged Detects	0.32	SD of Logged Detects	0.831

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.839	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.878	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.162	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.214	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	1.684	KM Standard Error of Mean	0.306
90KM SD	1.492	95% KM (BCA) UCL	2.207

95% KM (t) UCL	2.207	95% KM (Percentile Bootstrap) UCL	2.184
95% KM (z) UCL	2.187	95% KM Bootstrap t UCL	2.408
90% KM Chebyshev UCL	2.601	95% KM Chebyshev UCL	3.017
97.5% KM Chebyshev UCL	3.594	99% KM Chebyshev UCL	4.727

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.328	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.138	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.188	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.783	k star (bias corrected MLE)	1.57
Theta hat (MLE)	1.049	Theta star (bias corrected MLE)	1.191
nu hat (MLE)	78.45	nu star (bias corrected)	69.09
Mean (detects)	1.87		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.665
Maximum	6.2	Median	1.4
SD	1.539	CV	0.924
k hat (MLE)	0.929	k star (bias corrected MLE)	0.844
Theta hat (MLE)	1.792	Theta star (bias corrected MLE)	1.972
nu hat (MLE)	46.46	nu star (bias corrected)	42.22
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (42.22, α)	28.33	Adjusted Chi Square Value (42.22, β)	27.55
95% Gamma Approximate UCL	2.482	95% Gamma Adjusted UCL	2.552

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	1.684	SD (KM)	1.492
Variance (KM)	2.227	SE of Mean (KM)	0.306
k hat (KM)	1.273	k star (KM)	1.147
nu hat (KM)	63.66	nu star (KM)	57.35
theta hat (KM)	1.322	theta star (KM)	1.468
80% gamma percentile (KM)	2.677	90% gamma percentile (KM)	3.748
95% gamma percentile (KM)	4.807	99% gamma percentile (KM)	7.242

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (57.35, α)	40.94	Adjusted Chi Square Value (57.35, β)	40
95% KM Approximate Gamma UCL	2.358	95% KM Adjusted Gamma UCL	2.414

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.973	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.926	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.117	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.169	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.687	Mean in Log Scale	0.139
SD in Original Scale	1.517	SD in Log Scale	0.942
95% t UCL (assumes normality of ROS data)	2.206	95% Percentile Bootstrap UCL	2.186
95% BCA Bootstrap UCL	2.26	95% Bootstrap t UCL	2.381
95% H-UCL (Log ROS)	2.851		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	0.106	KM Geo Mean	1.112
KM SD (logged)	0.988	95% Critical H Value (KM-Log)	2.48
KM Standard Error of Mean (logged)	0.205	95% H-UCL (KM -Log)	2.987
KM SD (logged)	0.988	95% Critical H Value (KM-Log)	2.48
KM Standard Error of Mean (logged)	0.205		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.686	Mean in Log Scale	0.0905
SD in Original Scale	1.521	SD in Log Scale	1.064
95% t UCL (Assumes normality)	2.206	95% H-Stat UCL	3.372

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 2.207

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Malathion

General Statistics

Total Number of Observations	18	Number of Distinct Observations	16
		Number of Missing Observations	388
Number of Detects	6	Number of Non-Detects	12
Number of Distinct Detects	6	Number of Distinct Non-Detects	10
Minimum Detect	0.01	Minimum Non-Detect	0.005
Maximum Detect	0.52	Maximum Non-Detect	2.8
Variance Detects	0.0428	Percent Non-Detects	66.67%
Mean Detects	0.0977	SD Detects	0.207
Median Detects	0.0125	CV Detects	2.119
Skewness Detects	2.448	Kurtosis Detects	5.994
Mean of Logged Detects	-3.741	SD of Logged Detects	1.531

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.51	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.713	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.48	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.373	Detected Data Not Normal at 1% Significance Level	

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0417	KM Standard Error of Mean	0.0339
90KM SD	0.124	95% KM (BCA) UCL	0.107
95% KM (t) UCL	0.101	95% KM (Percentile Bootstrap) UCL	0.1
95% KM (z) UCL	0.0974	95% KM Bootstrap t UCL	0.987
90% KM Chebyshev UCL	0.143	95% KM Chebyshev UCL	0.189
97.5% KM Chebyshev UCL	0.253	99% KM Chebyshev UCL	0.379

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.418	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.743	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.461	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.35	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.456	k star (bias corrected MLE)	0.339
Theta hat (MLE)	0.214	Theta star (bias corrected MLE)	0.288
nu hat (MLE)	5.466	nu star (bias corrected)	4.066
Mean (detects)	0.0977		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0392
Maximum	0.52	Median	0.01
SD	0.12	CV	3.06
k hat (MLE)	0.576	k star (bias corrected MLE)	0.517
Theta hat (MLE)	0.0681	Theta star (bias corrected MLE)	0.0758
nu hat (MLE)	20.75	nu star (bias corrected)	18.62
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (18.62, α)	9.842	Adjusted Chi Square Value (18.62, β)	9.232
95% Gamma Approximate UCL	0.0742	95% Gamma Adjusted UCL	0.0791

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0417	SD (KM)	0.124
Variance (KM)	0.0153	SE of Mean (KM)	0.0339
k hat (KM)	0.114	k star (KM)	0.132
nu hat (KM)	4.105	nu star (KM)	4.754
theta hat (KM)	0.366	theta star (KM)	0.316
80% gamma percentile (KM)	0.0405	90% gamma percentile (KM)	0.121
95% gamma percentile (KM)	0.235	99% gamma percentile (KM)	0.575

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (4.75, α)	1.04	Adjusted Chi Square Value (4.75, β)	0.887
95% KM Approximate Gamma UCL	0.191	95% KM Adjusted Gamma UCL	0.224

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.629	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.826	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.378	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.298	Detected Data Not Lognormal at 10% Significance Level	

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0357	Mean in Log Scale	-4.943
SD in Original Scale	0.121	SD in Log Scale	1.355
95% t UCL (assumes normality of ROS data)	0.0853	95% Percentile Bootstrap UCL	0.0924
95% BCA Bootstrap UCL	0.122	95% Bootstrap t UCL	1.081
95% H-UCL (Log ROS)	0.051		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.479	KM Geo Mean	0.0113
KM SD (logged)	1.092	95% Critical H Value (KM-Log)	2.774
KM Standard Error of Mean (logged)	0.32	95% H-UCL (KM -Log)	0.0429

KM SD (logged)	1.092	95% Critical H Value (KM-Log)	2.774
KM Standard Error of Mean (logged)	0.32		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.199	Mean in Log Scale	-3.705
SD in Original Scale	0.445	SD in Log Scale	1.959
95% t UCL (Assumes normality)	0.381	95% H-Stat UCL	1.254

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 0.101

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Mercury

General Statistics

Total Number of Observations	63	Number of Distinct Observations	59
		Number of Missing Observations	352
Minimum	0.00649	Mean	0.0285
Maximum	0.114	Median	0.0258
SD	0.0145	Std. Error of Mean	0.00183
Coefficient of Variation	0.509	Skewness	3.711

Normal GOF Test

Shapiro Wilk Test Statistic	0.694	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.212	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.129	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.0316	95% Adjusted-CLT UCL (Chen-1995)	0.0324
		95% Modified-t UCL (Johnson-1978)	0.0317

Gamma GOF Test

A-D Test Statistic	2.044	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.753	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.139	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.112	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.181	k star (bias corrected MLE)	5.897
Theta hat (MLE)	0.00462	Theta star (bias corrected MLE)	0.00484
nu hat (MLE)	778.8	nu star (bias corrected)	743.1

MLE Mean (bias corrected)	0.0285	MLE Sd (bias corrected)	0.0117
		Approximate Chi Square Value (0.05)	680.8
Adjusted Level of Significance	0.0462	Adjusted Chi Square Value	679.4

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0311	95% Adjusted Gamma UCL	0.0312

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.938	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.00524	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.116	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.102	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-5.037	Mean of logged Data	-3.64
Maximum of Logged Data	-2.172	SD of logged Data	0.392

Assuming Lognormal Distribution

95% H-UCL	0.031	90% Chebyshev (MVUE) UCL	0.0326
95% Chebyshev (MVUE) UCL	0.0346	97.5% Chebyshev (MVUE) UCL	0.0373
99% Chebyshev (MVUE) UCL	0.0427		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0315	95% BCA Bootstrap UCL	0.0328
95% Standard Bootstrap UCL	0.0315	95% Bootstrap-t UCL	0.0335
95% Hall's Bootstrap UCL	0.0461	95% Percentile Bootstrap UCL	0.0318
90% Chebyshev(Mean, Sd) UCL	0.034	95% Chebyshev(Mean, Sd) UCL	0.0365
97.5% Chebyshev(Mean, Sd) UCL	0.0399	99% Chebyshev(Mean, Sd) UCL	0.0467

Suggested UCL to Use

95% Student's-t UCL	0.0316

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Methoxychlor

General Statistics

Total Number of Observations	18	Number of Distinct Observations	14
		Number of Missing Observations	386
Number of Detects	1	Number of Non-Detects	17
Number of Distinct Detects	1	Number of Distinct Non-Detects	13

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Methoxychlor was not processed!

Molybdenum

General Statistics

Total Number of Observations	54	Number of Distinct Observations	51
		Number of Missing Observations	367

Minimum	1.51	Mean	4.276
Maximum	48.7	Median	3.01
SD	6.367	Std. Error of Mean	0.866
Coefficient of Variation	1.489	Skewness	6.641

Normal GOF Test

Shapiro Wilk Test Statistic	0.334	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.332	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.139	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	5.727	95% Adjusted-CLT UCL (Chen-1995)	6.538
		95% Modified-t UCL (Johnson-1978)	5.857

Gamma GOF Test

A-D Test Statistic	3.436	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.763	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.17	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.123	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.007	k star (bias corrected MLE)	1.908
Theta hat (MLE)	2.131	Theta star (bias corrected MLE)	2.241
nu hat (MLE)	216.8	nu star (bias corrected)	206
MLE Mean (bias corrected)	4.276	MLE Sd (bias corrected)	3.096
		Approximate Chi Square Value (0.05)	173.8
Adjusted Level of Significance	0.0456	Adjusted Chi Square Value	173

Assuming Gamma Distribution

95% Approximate Gamma UCL	5.069	95% Adjusted Gamma UCL	5.092

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.864	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	1.8583E-6	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0927	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.11	Data appear Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.412	Mean of logged Data	1.184
Maximum of Logged Data	3.886	SD of logged Data	0.583

Assuming Lognormal Distribution

95% H-UCL	4.521	90% Chebyshev (MVUE) UCL	4.837
95% Chebyshev (MVUE) UCL	5.281	97.5% Chebyshev (MVUE) UCL	5.897
99% Chebyshev (MVUE) UCL	7.107		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	5.701	95% BCA Bootstrap UCL	6.904
95% Standard Bootstrap UCL	5.652	95% Bootstrap-t UCL	8.999
95% Hall's Bootstrap UCL	11.22	95% Percentile Bootstrap UCL	5.883
90% Chebyshev(Mean, Sd) UCL	6.876	95% Chebyshev(Mean, Sd) UCL	8.053
97.5% Chebyshev(Mean, Sd) UCL	9.687	99% Chebyshev(Mean, Sd) UCL	12.9

Suggested UCL to Use

95% H-UCL 4.521

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Naphthalene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	22
		Number of Missing Observations	381
Number of Detects	10	Number of Non-Detects	17
Number of Distinct Detects	10	Number of Distinct Non-Detects	12
Minimum Detect	0.102	Minimum Non-Detect	0.11
Maximum Detect	0.98	Maximum Non-Detect	53
Variance Detects	0.073	Percent Non-Detects	62.96%
Mean Detects	0.234	SD Detects	0.27
Median Detects	0.135	CV Detects	1.152
Skewness Detects	2.854	Kurtosis Detects	8.376
Mean of Logged Detects	-1.759	SD of Logged Detects	0.695

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.531	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.781	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.408	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.304	Detected Data Not Normal at 1% Significance Level

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.178	KM Standard Error of Mean	0.042
90KM SD	0.183	95% KM (BCA) UCL	0.253
95% KM (t) UCL	0.25	95% KM (Percentile Bootstrap) UCL	0.254
95% KM (z) UCL	0.247	95% KM Bootstrap t UCL	0.53
90% KM Chebyshev UCL	0.304	95% KM Chebyshev UCL	0.361
97.5% KM Chebyshev UCL	0.44	99% KM Chebyshev UCL	0.596

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.6	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.737	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.385	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.27	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.77	k star (bias corrected MLE)	1.306
Theta hat (MLE)	0.132	Theta star (bias corrected MLE)	0.18
nu hat (MLE)	35.4	nu star (bias corrected)	26.11
Mean (detects)	0.234		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.158
Maximum	0.98	Median	0.127
SD	0.177	CV	1.119
k hat (MLE)	1.599	k star (bias corrected MLE)	1.446
Theta hat (MLE)	0.099	Theta star (bias corrected MLE)	0.11
nu hat (MLE)	86.34	nu star (bias corrected)	78.08
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (78.08, α)	58.73	Adjusted Chi Square Value (78.08, β)	57.65
95% Gamma Approximate UCL	0.211	95% Gamma Adjusted UCL	0.214

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.178	SD (KM)	0.183
Variance (KM)	0.0335	SE of Mean (KM)	0.042
k hat (KM)	0.946	k star (KM)	0.866
nu hat (KM)	51.09	nu star (KM)	46.75
theta hat (KM)	0.188	theta star (KM)	0.206
80% gamma percentile (KM)	0.29	90% gamma percentile (KM)	0.425
95% gamma percentile (KM)	0.561	99% gamma percentile (KM)	0.882

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (46.75, α)	32.06	Adjusted Chi Square Value (46.75, β)	31.28
95% KM Approximate Gamma UCL	0.26	95% KM Adjusted Gamma UCL	0.266

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.716	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.869	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.341	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.241	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.172	Mean in Log Scale	-1.934
SD in Original Scale	0.168	SD in Log Scale	0.484
95% t UCL (assumes normality of ROS data)	0.227	95% Percentile Bootstrap UCL	0.232
95% BCA Bootstrap UCL	0.268	95% Bootstrap t UCL	0.404
95% H-UCL (Log ROS)	0.196		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.927	KM Geo Mean	0.146
KM SD (logged)	0.503	95% Critical H Value (KM-Log)	1.973
KM Standard Error of Mean (logged)	0.124	95% H-UCL (KM -Log)	0.201
KM SD (logged)	0.503	95% Critical H Value (KM-Log)	1.973
KM Standard Error of Mean (logged)	0.124		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.551	Mean in Log Scale	-1.138
SD in Original Scale	5.103	SD in Log Scale	1.389
95% t UCL (Assumes normality)	3.226	95% H-Stat UCL	1.938

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 0.25

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Naphthobenzothiophene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Number of Detects	7	Number of Non-Detects	2
Number of Distinct Detects	7	Number of Distinct Non-Detects	2
Minimum Detect	0.0127	Minimum Non-Detect	0.00103
Maximum Detect	0.0337	Maximum Non-Detect	0.00103
Variance Detects	5.4025E-5	Percent Non-Detects	22.22%
Mean Detects	0.0192	SD Detects	0.00735
Median Detects	0.0183	CV Detects	0.384
Skewness Detects	1.49	Kurtosis Detects	2.405
Mean of Logged Detects	-4.009	SD of Logged Detects	0.346

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.848	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.73	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.196	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.35	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0151	KM Standard Error of Mean	0.00347
90KM SD	0.00964	95% KM (BCA) UCL	0.0206
95% KM (t) UCL	0.0216	95% KM (Percentile Bootstrap) UCL	0.0205
95% KM (z) UCL	0.0208	95% KM Bootstrap t UCL	0.021
90% KM Chebyshev UCL	0.0255	95% KM Chebyshev UCL	0.0303
97.5% KM Chebyshev UCL	0.0368	99% KM Chebyshev UCL	0.0497

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.384	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.709	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.218	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.312	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	9.313	k star (bias corrected MLE)	5.417
Theta hat (MLE)	0.00206	Theta star (bias corrected MLE)	0.00354
nu hat (MLE)	130.4	nu star (bias corrected)	75.84

Mean (detects)	0.0192

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0171
Maximum	0.0337	Median	0.014
SD	0.00754	CV	0.44
k hat (MLE)	6.856	k star (bias corrected MLE)	4.645
Theta hat (MLE)	0.0025	Theta star (bias corrected MLE)	0.00369
nu hat (MLE)	123.4	nu star (bias corrected)	83.6
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (83.60, α)	63.53	Adjusted Chi Square Value (83.60, β)	59.85
95% Gamma Approximate UCL	0.0225	95% Gamma Adjusted UCL	0.0239

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0151	SD (KM)	0.00964
Variance (KM)	9.2852E-5	SE of Mean (KM)	0.00347
k hat (KM)	2.467	k star (KM)	1.719
nu hat (KM)	44.4	nu star (KM)	30.93
theta hat (KM)	0.00614	theta star (KM)	0.00881
80% gamma percentile (KM)	0.0231	90% gamma percentile (KM)	0.0305
95% gamma percentile (KM)	0.0377	99% gamma percentile (KM)	0.0538

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (30.93, α)	19.23	Adjusted Chi Square Value (30.93, β)	17.31
95% KM Approximate Gamma UCL	0.0243	95% KM Adjusted Gamma UCL	0.027

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.913	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.838	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.204	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0166	Mean in Log Scale	-4.198
SD in Original Scale	0.00811	SD in Log Scale	0.48
95% t UCL (assumes normality of ROS data)	0.0217	95% Percentile Bootstrap UCL	0.021
95% BCA Bootstrap UCL	0.0216	95% Bootstrap t UCL	0.0236
95% H-UCL (Log ROS)	0.0245		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.647	KM Geo Mean	0.00959
KM SD (logged)	1.226	95% Critical H Value (KM-Log)	3.761
KM Standard Error of Mean (logged)	0.441	95% H-UCL (KM -Log)	0.104
KM SD (logged)	1.226	95% Critical H Value (KM-Log)	3.761
KM Standard Error of Mean (logged)	0.441		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.015	Mean in Log Scale	-4.801
SD in Original Scale	0.0104	SD in Log Scale	1.598
95% t UCL (Assumes normality)	0.0215	95% H-Stat UCL	0.417

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0216

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Nickel

General Statistics

Total Number of Observations	62	Number of Distinct Observations	56
		Number of Missing Observations	360
Minimum	1.07	Mean	4.334
Maximum	6.7	Median	4.575
SD	1.238	Std. Error of Mean	0.157
Coefficient of Variation	0.286	Skewness	-1.113

Normal GOF Test

Shapiro Wilk Test Statistic	0.881	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	1.8712E-6	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.196	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.13	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.597	95% Adjusted-CLT UCL (Chen-1995)	4.569
		95% Modified-t UCL (Johnson-1978)	4.593

Gamma GOF Test

A-D Test Statistic	5.067	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.752	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.251	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.126	k star (bias corrected MLE)	7.744
Theta hat (MLE)	0.533	Theta star (bias corrected MLE)	0.56
nu hat (MLE)	1008	nu star (bias corrected)	960.2
MLE Mean (bias corrected)	4.334	MLE Sd (bias corrected)	1.558
		Approximate Chi Square Value (0.05)	889.3
Adjusted Level of Significance	0.0461	Adjusted Chi Square Value	887.7

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.68	95% Adjusted Gamma UCL	4.689

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.726	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	3.997E-15	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.27	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.103	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.0677	Mean of logged Data	1.404

Maximum of Logged Data	1.902	SD of logged Data	0.406

Assuming Lognormal Distribution

95% H-UCL	4.855	90% Chebyshev (MVUE) UCL	5.121
95% Chebyshev (MVUE) UCL	5.441	97.5% Chebyshev (MVUE) UCL	5.885
99% Chebyshev (MVUE) UCL	6.758		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	4.593	95% BCA Bootstrap UCL	4.565
95% Standard Bootstrap UCL	4.587	95% Bootstrap-t UCL	4.576
95% Hall's Bootstrap UCL	4.574	95% Percentile Bootstrap UCL	4.572
90% Chebyshev(Mean, Sd) UCL	4.806	95% Chebyshev(Mean, Sd) UCL	5.02
97.5% Chebyshev(Mean, Sd) UCL	5.316	99% Chebyshev(Mean, Sd) UCL	5.899

Suggested UCL to Use

95% Student's-t UCL	4.597

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

N-Nitrosodimethylamine

General Statistics

Total Number of Observations	15	Number of Distinct Observations	10
		Number of Missing Observations	392
Number of Detects	1	Number of Non-Detects	14
Number of Distinct Detects	1	Number of Distinct Non-Detects	9

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable N-Nitrosodimethylamine was not processed!

Oil and Grease, Total (HEM)

General Statistics

Total Number of Observations	18	Number of Distinct Observations	17
		Number of Missing Observations	383
Minimum	12500	Mean	28272
Maximum	42700	Median	28600
SD	9122	Std. Error of Mean	2150
Coefficient of Variation	0.323	Skewness	-0.0895

Normal GOF Test

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.858	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.147	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.235	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	32012	95% Adjusted-CLT UCL (Chen-1995)	31760
		95% Modified-t UCL (Johnson-1978)	32005

Gamma GOF Test

A-D Test Statistic	0.523	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.156	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.204	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	8.928	k star (bias corrected MLE)	7.477
Theta hat (MLE)	3167	Theta star (bias corrected MLE)	3781
nu hat (MLE)	321.4	nu star (bias corrected)	269.2
MLE Mean (bias corrected)	28272	MLE Sd (bias corrected)	10339
		Approximate Chi Square Value (0.05)	232.2
Adjusted Level of Significance	0.0357	Adjusted Chi Square Value	228.9

Assuming Gamma Distribution

95% Approximate Gamma UCL	32777	95% Adjusted Gamma UCL	33249

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.909	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.914	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.18	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.185	Data appear Lognormal at 10% Significance Level

Data appear Approximate Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	9.433	Mean of logged Data	10.19
Maximum of Logged Data	10.66	SD of logged Data	0.364

Assuming Lognormal Distribution

95% H-UCL	33741	90% Chebyshev (MVUE) UCL	35868
95% Chebyshev (MVUE) UCL	39241	97.5% Chebyshev (MVUE) UCL	43923
99% Chebyshev (MVUE) UCL	53120		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	31809	95% BCA Bootstrap UCL	31772
95% Standard Bootstrap UCL	31724	95% Bootstrap-t UCL	32000
95% Hall's Bootstrap UCL	31853	95% Percentile Bootstrap UCL	31739
90% Chebyshev(Mean, Sd) UCL	34722	95% Chebyshev(Mean, Sd) UCL	37644
97.5% Chebyshev(Mean, Sd) UCL	41699	99% Chebyshev(Mean, Sd) UCL	49665

Suggested UCL to Use

95% Student's-t UCL	32012

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

o-Xylene

General Statistics

Total Number of Observations	25	Number of Distinct Observations	22
		Number of Missing Observations	402
Number of Detects	23	Number of Non-Detects	2
Number of Distinct Detects	21	Number of Distinct Non-Detects	1
Minimum Detect	0.1	Minimum Non-Detect	0.7
Maximum Detect	2.6	Maximum Non-Detect	0.7
Variance Detects	0.426	Percent Non-Detects	8%
Mean Detects	0.813	SD Detects	0.652
Median Detects	0.6	CV Detects	0.802
Skewness Detects	1.541	Kurtosis Detects	1.999
Mean of Logged Detects	-0.488	SD of Logged Detects	0.779

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.828	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.209	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.779	KM Standard Error of Mean	0.128
90KM SD	0.624	95% KM (BCA) UCL	0.985
95% KM (t) UCL	0.998	95% KM (Percentile Bootstrap) UCL	0.985
95% KM (z) UCL	0.99	95% KM Bootstrap t UCL	1.079
90% KM Chebyshev UCL	1.163	95% KM Chebyshev UCL	1.337
97.5% KM Chebyshev UCL	1.578	99% KM Chebyshev UCL	2.052

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.45	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.128	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.184	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.93	k star (bias corrected MLE)	1.708
Theta hat (MLE)	0.421	Theta star (bias corrected MLE)	0.476
nu hat (MLE)	88.8	nu star (bias corrected)	78.55
Mean (detects)	0.813		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.1	Mean	0.777
Maximum	2.6	Median	0.54
SD	0.638	CV	0.822
k hat (MLE)	1.908	k star (bias corrected MLE)	1.705
Theta hat (MLE)	0.407	Theta star (bias corrected MLE)	0.455
nu hat (MLE)	95.38	nu star (bias corrected)	85.27
Adjusted Level of Significance (β)	0.0395		
Approximate Chi Square Value (85.27, α)	64.98	Adjusted Chi Square Value (85.27, β)	63.78
95% Gamma Approximate UCL	1.019	95% Gamma Adjusted UCL	1.038

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.779	SD (KM)	0.624
Variance (KM)	0.389	SE of Mean (KM)	0.128

k hat (KM)	1.559	k star (KM)	1.398
nu hat (KM)	77.94	nu star (KM)	69.92
theta hat (KM)	0.5	theta star (KM)	0.557
80% gamma percentile (KM)	1.215	90% gamma percentile (KM)	1.652
95% gamma percentile (KM)	2.078	99% gamma percentile (KM)	3.046

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (69.92, α)	51.67	Adjusted Chi Square Value (69.92, β)	50.6
95% KM Approximate Gamma UCL	1.054	95% KM Adjusted Gamma UCL	1.077

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.971	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.928	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.112	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.165	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.779	Mean in Log Scale	-0.528
SD in Original Scale	0.636	SD in Log Scale	0.762
95% t UCL (assumes normality of ROS data)	0.996	95% Percentile Bootstrap UCL	0.994
95% BCA Bootstrap UCL	1.018	95% Bootstrap t UCL	1.065
95% H-UCL (Log ROS)	1.113		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.531	KM Geo Mean	0.588
KM SD (logged)	0.757	95% Critical H Value (KM-Log)	2.207
KM Standard Error of Mean (logged)	0.158	95% H-UCL (KM -Log)	1.101
KM SD (logged)	0.757	95% Critical H Value (KM-Log)	2.207
KM Standard Error of Mean (logged)	0.158		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.776	Mean in Log Scale	-0.533
SD in Original Scale	0.638	SD in Log Scale	0.762
95% t UCL (Assumes normality)	0.994	95% H-Stat UCL	1.107

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.998

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Pentachlorophenol (PCP)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	11
		Number of Missing Observations	392
Number of Detects	1	Number of Non-Detects	14
Number of Distinct Detects	1	Number of Distinct Non-Detects	10

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!

It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Pentachlorophenol (PCP) was not processed!

Perylene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.00314	Minimum Non-Detect	6.3472E-4
Maximum Detect	0.0333	Maximum Non-Detect	6.3472E-4
Variance Detects	1.1262E-4	Percent Non-Detects	11.11%
Mean Detects	0.0158	SD Detects	0.0106
Median Detects	0.0146	CV Detects	0.673
Skewness Detects	0.442	Kurtosis Detects	-1.016
Mean of Logged Detects	-4.403	SD of Logged Detects	0.817

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.749	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.172	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.333	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0141	KM Standard Error of Mean	0.00374
90KM SD	0.0105	95% KM (BCA) UCL	0.02
95% KM (t) UCL	0.021	95% KM (Percentile Bootstrap) UCL	0.02
95% KM (z) UCL	0.0202	95% KM Bootstrap t UCL	0.0224
90% KM Chebyshev UCL	0.0253	95% KM Chebyshev UCL	0.0304
97.5% KM Chebyshev UCL	0.0374	99% KM Chebyshev UCL	0.0513

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.248	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.724	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.173	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.297	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	2.133	k star (bias corrected MLE)	1.416
Theta hat (MLE)	0.00739	Theta star (bias corrected MLE)	0.0111
nu hat (MLE)	34.13	nu star (bias corrected)	22.66
Mean (detects)	0.0158		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.00314	Mean	0.0151
Maximum	0.0333	Median	0.011
SD	0.0101	CV	0.669
k hat (MLE)	2.295	k star (bias corrected MLE)	1.604
Theta hat (MLE)	0.00659	Theta star (bias corrected MLE)	0.00942
nu hat (MLE)	41.31	nu star (bias corrected)	28.87
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (28.87, α)	17.61	Adjusted Chi Square Value (28.87, β)	15.78
95% Gamma Approximate UCL	0.0248	95% Gamma Adjusted UCL	0.0277

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0141	SD (KM)	0.0105
Variance (KM)	1.1018E-4	SE of Mean (KM)	0.00374
k hat (KM)	1.799	k star (KM)	1.273
nu hat (KM)	32.37	nu star (KM)	22.92
theta hat (KM)	0.00783	theta star (KM)	0.0111
80% gamma percentile (KM)	0.0222	90% gamma percentile (KM)	0.0305
95% gamma percentile (KM)	0.0388	99% gamma percentile (KM)	0.0575

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (22.92, α)	13.03	Adjusted Chi Square Value (22.92, β)	11.49
95% KM Approximate Gamma UCL	0.0248	95% KM Adjusted Gamma UCL	0.0281

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.946	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.851	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.188	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0142	Mean in Log Scale	-4.625
SD in Original Scale	0.011	SD in Log Scale	1.014
95% t UCL (assumes normality of ROS data)	0.021	95% Percentile Bootstrap UCL	0.0202
95% BCA Bootstrap UCL	0.0203	95% Bootstrap t UCL	0.0221
95% H-UCL (Log ROS)	0.0529		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.732	KM Geo Mean	0.00881
KM SD (logged)	1.176	95% Critical H Value (KM-Log)	3.644
KM Standard Error of Mean (logged)	0.419	95% H-UCL (KM -Log)	0.0801
KM SD (logged)	1.176	95% Critical H Value (KM-Log)	3.644
KM Standard Error of Mean (logged)	0.419		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.014	Mean in Log Scale	-4.809
SD in Original Scale	0.0112	SD in Log Scale	1.437
95% t UCL (Assumes normality)	0.021	95% H-Stat UCL	0.202

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.021

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Phenanthrene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	24
		Number of Missing Observations	381
Number of Detects	16	Number of Non-Detects	11
Number of Distinct Detects	16	Number of Distinct Non-Detects	9
Minimum Detect	0.204	Minimum Non-Detect	0.26
Maximum Detect	0.98	Maximum Non-Detect	140
Variance Detects	0.0347	Percent Non-Detects	40.74%
Mean Detects	0.373	SD Detects	0.186
Median Detects	0.337	CV Detects	0.499
Skewness Detects	2.5	Kurtosis Detects	7.818
Mean of Logged Detects	-1.07	SD of Logged Detects	0.396

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.734	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.229	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.352	KM Standard Error of Mean	0.0375
90KM SD	0.164	95% KM (BCA) UCL	0.418
95% KM (t) UCL	0.416	95% KM (Percentile Bootstrap) UCL	0.417
95% KM (z) UCL	0.413	95% KM Bootstrap t UCL	0.452
90% KM Chebyshev UCL	0.464	95% KM Chebyshev UCL	0.515
97.5% KM Chebyshev UCL	0.586	99% KM Chebyshev UCL	0.725

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.648	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.741	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.186	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.216	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	6.143	k star (bias corrected MLE)	5.033
Theta hat (MLE)	0.0607	Theta star (bias corrected MLE)	0.0741
nu hat (MLE)	196.6	nu star (bias corrected)	161.1
Mean (detects)	0.373		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.198	Mean	0.346
Maximum	0.98	Median	0.329
SD	0.15	CV	0.434
k hat (MLE)	8.198	k star (bias corrected MLE)	7.312
Theta hat (MLE)	0.0422	Theta star (bias corrected MLE)	0.0473
nu hat (MLE)	442.7	nu star (bias corrected)	394.8

Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (394.84, α)	349.8	Adjusted Chi Square Value (394.84, β)	347.1
95% Gamma Approximate UCL	0.39	95% Gamma Adjusted UCL	0.393

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.352	SD (KM)	0.164
Variance (KM)	0.0269	SE of Mean (KM)	0.0375
k hat (KM)	4.608	k star (KM)	4.12
nu hat (KM)	248.8	nu star (KM)	222.5
theta hat (KM)	0.0763	theta star (KM)	0.0854
80% gamma percentile (KM)	0.483	90% gamma percentile (KM)	0.584
95% gamma percentile (KM)	0.677	99% gamma percentile (KM)	0.874

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (222.50, α)	189	Adjusted Chi Square Value (222.50, β)	187
95% KM Approximate Gamma UCL	0.414	95% KM Adjusted Gamma UCL	0.419

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.912	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.906	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.157	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.196	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.346	Mean in Log Scale	-1.118
SD in Original Scale	0.148	SD in Log Scale	0.322
95% t UCL (assumes normality of ROS data)	0.395	95% Percentile Bootstrap UCL	0.396
95% BCA Bootstrap UCL	0.416	95% Bootstrap t UCL	0.435
95% H-UCL (Log ROS)	0.386		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.121	KM Geo Mean	0.326
KM SD (logged)	0.366	95% Critical H Value (KM-Log)	1.866
KM Standard Error of Mean (logged)	0.0867	95% H-UCL (KM -Log)	0.398
KM SD (logged)	0.366	95% Critical H Value (KM-Log)	1.866
KM Standard Error of Mean (logged)	0.0867		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	3.814	Mean in Log Scale	-0.565
SD in Original Scale	13.54	SD in Log Scale	1.441
95% t UCL (Assumes normality)	8.26	95% H-Stat UCL	3.904

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.416

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Phenol

General Statistics

Total Number of Observations	18	Number of Distinct Observations	16
		Number of Missing Observations	390
Number of Detects	16	Number of Non-Detects	2
Number of Distinct Detects	14	Number of Distinct Non-Detects	2
Minimum Detect	6	Minimum Non-Detect	5.9
Maximum Detect	54.5	Maximum Non-Detect	59
Variance Detects	159.1	Percent Non-Detects	11.11%
Mean Detects	20.33	SD Detects	12.61
Median Detects	17.5	CV Detects	0.621
Skewness Detects	1.347	Kurtosis Detects	2.334
Mean of Logged Detects	2.839	SD of Logged Detects	0.615

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.892	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.164	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	19.48	KM Standard Error of Mean	3.087
90KM SD	12.32	95% KM (BCA) UCL	24.43
95% KM (t) UCL	24.85	95% KM (Percentile Bootstrap) UCL	24.54
95% KM (z) UCL	24.55	95% KM Bootstrap t UCL	26.62
90% KM Chebyshev UCL	28.74	95% KM Chebyshev UCL	32.93
97.5% KM Chebyshev UCL	38.76	99% KM Chebyshev UCL	50.19

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.178	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.744	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.121	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.217	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.053	k star (bias corrected MLE)	2.522
Theta hat (MLE)	6.657	Theta star (bias corrected MLE)	8.058
nu hat (MLE)	97.7	nu star (bias corrected)	80.71
Mean (detects)	20.33		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	19.02
Maximum	54.5	Median	16.04
SD	12.79	CV	0.672
k hat (MLE)	1.099	k star (bias corrected MLE)	0.953
Theta hat (MLE)	17.31	Theta star (bias corrected MLE)	19.96
nu hat (MLE)	39.56	nu star (bias corrected)	34.3
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (34.30, α)	21.9	Adjusted Chi Square Value (34.30, β)	20.95
95% Gamma Approximate UCL	29.78	95% Gamma Adjusted UCL	31.13

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	19.48	SD (KM)	12.32
Variance (KM)	151.9	SE of Mean (KM)	3.087
k hat (KM)	2.497	k star (KM)	2.118
nu hat (KM)	89.9	nu star (KM)	76.25
theta hat (KM)	7.799	theta star (KM)	9.196
80% gamma percentile (KM)	28.96	90% gamma percentile (KM)	37.37
95% gamma percentile (KM)	45.37	99% gamma percentile (KM)	63.05

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (76.25, α)	57.14	Adjusted Chi Square Value (76.25, β)	55.55
95% KM Approximate Gamma UCL	25.99	95% KM Adjusted Gamma UCL	26.73

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.98	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.906	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.1	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.196	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	19.15	Mean in Log Scale	2.75
SD in Original Scale	12.5	SD in Log Scale	0.68
95% t UCL (assumes normality of ROS data)	24.28	95% Percentile Bootstrap UCL	24.19
95% BCA Bootstrap UCL	24.92	95% Bootstrap t UCL	25.77
95% H-UCL (Log ROS)	28.39		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	2.777	KM Geo Mean	16.06
KM SD (logged)	0.63	95% Critical H Value (KM-Log)	2.157
KM Standard Error of Mean (logged)	0.158	95% H-UCL (KM -Log)	27.23
KM SD (logged)	0.63	95% Critical H Value (KM-Log)	2.157
KM Standard Error of Mean (logged)	0.158		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	19.87	Mean in Log Scale	2.772
SD in Original Scale	12.76	SD in Log Scale	0.727
95% t UCL (Assumes normality)	25.1	95% H-Stat UCL	31.06

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	24.85

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Pyrene

General Statistics

Total Number of Observations	27	Number of Distinct Observations	22
		Number of Missing Observations	381
Number of Detects	12	Number of Non-Detects	15
Number of Distinct Detects	12	Number of Distinct Non-Detects	11
Minimum Detect	0.0913	Minimum Non-Detect	0.47
Maximum Detect	0.47	Maximum Non-Detect	74
Variance Detects	0.0118	Percent Non-Detects	55.56%

Mean Detects	0.175	SD Detects	0.109
Median Detects	0.131	CV Detects	0.622
Skewness Detects	2.057	Kurtosis Detects	4.738
Mean of Logged Detects	-1.874	SD of Logged Detects	0.5

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.755	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.805	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.229	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.281	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.171	KM Standard Error of Mean	0.0285
90KM SD	0.0993	95% KM (BCA) UCL	0.223
95% KM (t) UCL	0.22	95% KM (Percentile Bootstrap) UCL	0.22
95% KM (z) UCL	0.218	95% KM Bootstrap t UCL	0.258
90% KM Chebyshev UCL	0.257	95% KM Chebyshev UCL	0.295
97.5% KM Chebyshev UCL	0.349	99% KM Chebyshev UCL	0.454

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.675	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.214	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.246	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.978	k star (bias corrected MLE)	3.039
Theta hat (MLE)	0.044	Theta star (bias corrected MLE)	0.0576
nu hat (MLE)	95.48	nu star (bias corrected)	72.94
Mean (detects)	0.175		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0913	Mean	0.165
Maximum	0.47	Median	0.157
SD	0.0755	CV	0.458
k hat (MLE)	7.106	k star (bias corrected MLE)	6.341
Theta hat (MLE)	0.0232	Theta star (bias corrected MLE)	0.026
nu hat (MLE)	383.7	nu star (bias corrected)	342.4
Adjusted Level of Significance (β)	0.0401		
Approximate Chi Square Value (342.42, α)	300.5	Adjusted Chi Square Value (342.42, β)	298
95% Gamma Approximate UCL	0.188	95% Gamma Adjusted UCL	0.19

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.171	SD (KM)	0.0993
Variance (KM)	0.00985	SE of Mean (KM)	0.0285
k hat (KM)	2.974	k star (KM)	2.668
nu hat (KM)	160.6	nu star (KM)	144.1
theta hat (KM)	0.0576	theta star (KM)	0.0642
80% gamma percentile (KM)	0.248	90% gamma percentile (KM)	0.312
95% gamma percentile (KM)	0.372	99% gamma percentile (KM)	0.503

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (144.09, α)	117.4	Adjusted Chi Square Value (144.09, β)	115.8
95% KM Approximate Gamma UCL	0.21	95% KM Adjusted Gamma UCL	0.213

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.889	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.883	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.188	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.223	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.162	Mean in Log Scale	-1.889
SD in Original Scale	0.0742	SD in Log Scale	0.349
95% t UCL (assumes normality of ROS data)	0.186	95% Percentile Bootstrap UCL	0.188
95% BCA Bootstrap UCL	0.198	95% Bootstrap t UCL	0.207
95% H-UCL (Log ROS)	0.182		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.888	KM Geo Mean	0.151
KM SD (logged)	0.465	95% Critical H Value (KM-Log)	1.941
KM Standard Error of Mean (logged)	0.136	95% H-UCL (KM -Log)	0.201
KM SD (logged)	0.465	95% Critical H Value (KM-Log)	1.941
KM Standard Error of Mean (logged)	0.136		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	2.204	Mean in Log Scale	-0.788
SD in Original Scale	7.117	SD in Log Scale	1.458
95% t UCL (Assumes normality)	4.54	95% H-Stat UCL	3.263

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.22

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Retene

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Number of Detects	8	Number of Non-Detects	1
Number of Distinct Detects	8	Number of Distinct Non-Detects	1
Minimum Detect	0.0082	Minimum Non-Detect	0.00159
Maximum Detect	0.0108	Maximum Non-Detect	0.00159
Variance Detects	7.1970E-7	Percent Non-Detects	11.11%
Mean Detects	0.0092	SD Detects	8.4835E-4
Median Detects	0.00915	CV Detects	0.0922
Skewness Detects	0.71	Kurtosis Detects	0.546
Mean of Logged Detects	-4.692	SD of Logged Detects	0.0906

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.749	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.142	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.333	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00835	KM Standard Error of Mean	8.9240E-4
90KM SD	0.0025	95% KM (BCA) UCL	0.00945
95% KM (t) UCL	0.01	95% KM (Percentile Bootstrap) UCL	0.00949
95% KM (z) UCL	0.00982	95% KM Bootstrap t UCL	0.00945
90% KM Chebyshev UCL	0.011	95% KM Chebyshev UCL	0.0122
97.5% KM Chebyshev UCL	0.0139	99% KM Chebyshev UCL	0.0172

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.229	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.715	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.136	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.294	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	137.8	k star (bias corrected MLE)	86.21
Theta hat (MLE)	6.6753E-5	Theta star (bias corrected MLE)	1.0670E-4
nu hat (MLE)	2205	nu star (bias corrected)	1379
Mean (detects)	0.0092		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0082	Mean	0.00929
Maximum	0.0108	Median	0.0092
SD	8.3734E-4	CV	0.0902
k hat (MLE)	139.8	k star (bias corrected MLE)	93.25
Theta hat (MLE)	6.6448E-5	Theta star (bias corrected MLE)	9.9593E-5
nu hat (MLE)	2516	nu star (bias corrected)	1679
Adjusted Level of Significance (β)	0.0231		
Approximate Chi Square Value (N/A, α)	1584	Adjusted Chi Square Value (N/A, β)	1565
95% Gamma Approximate UCL	0.00984	95% Gamma Adjusted UCL	0.00996

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00835	SD (KM)	0.0025
Variance (KM)	6.2714E-6	SE of Mean (KM)	8.9240E-4
k hat (KM)	11.13	k star (KM)	7.492
nu hat (KM)	200.3	nu star (KM)	134.9
theta hat (KM)	7.5076E-4	theta star (KM)	0.00112
80% gamma percentile (KM)	0.0108	90% gamma percentile (KM)	0.0124

95% gamma percentile (KM)	0.0139	99% gamma percentile (KM)	0.017

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (134.85, α)	109	Adjusted Chi Square Value (134.85, β)	104.1
95% KM Approximate Gamma UCL	0.0103	95% KM Adjusted Gamma UCL	0.0108

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.954	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.851	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.131	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.265	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00899	Mean in Log Scale	-4.717
SD in Original Scale	0.00101	SD in Log Scale	0.113
95% t UCL (assumes normality of ROS data)	0.00962	95% Percentile Bootstrap UCL	0.0095
95% BCA Bootstrap UCL	0.00949	95% Bootstrap t UCL	0.00962
95% H-UCL (Log ROS)	0.00968		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.887	KM Geo Mean	0.00755
KM SD (logged)	0.556	95% Critical H Value (KM-Log)	2.33
KM Standard Error of Mean (logged)	0.198	95% H-UCL (KM -Log)	0.0139
KM SD (logged)	0.556	95% Critical H Value (KM-Log)	2.33
KM Standard Error of Mean (logged)	0.198		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00826	Mean in Log Scale	-4.964
SD in Original Scale	0.00291	SD in Log Scale	0.819
95% t UCL (Assumes normality)	0.0101	95% H-Stat UCL	0.0223

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.01

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Selenium

General Statistics

Total Number of Observations	54	Number of Distinct Observations	8
		Number of Missing Observations	367
Minimum	0.5	Mean	0.811
Maximum	1.2	Median	0.8
SD	0.16	Std. Error of Mean	0.0217
Coefficient of Variation	0.197	Skewness	0.446

Normal GOF Test

Shapiro Wilk Test Statistic	0.939	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0.0133	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.145	**Lilliefors GOF Test**

1% Lilliefors Critical Value	0.139	Data Not Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.848	95% Adjusted-CLT UCL (Chen-1995)	0.848
		95% Modified-t UCL (Johnson-1978)	0.848

Gamma GOF Test

A-D Test Statistic	1.084	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.748	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.139	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.121	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	26.49	k star (bias corrected MLE)	25.03
Theta hat (MLE)	0.0306	Theta star (bias corrected MLE)	0.0324
nu hat (MLE)	2861	nu star (bias corrected)	2703
MLE Mean (bias corrected)	0.811	MLE Sd (bias corrected)	0.162
		Approximate Chi Square Value (0.05)	2583
Adjusted Level of Significance	0.0456	Adjusted Chi Square Value	2580

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.849	95% Adjusted Gamma UCL	0.85

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.949	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0.041	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.131	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.11	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.693	Mean of logged Data	-0.228
Maximum of Logged Data	0.182	SD of logged Data	0.197

Assuming Lognormal Distribution

95% H-UCL	0.85	90% Chebyshev (MVUE) UCL	0.877
95% Chebyshev (MVUE) UCL	0.907	97.5% Chebyshev (MVUE) UCL	0.948
99% Chebyshev (MVUE) UCL	1.03		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.847	95% BCA Bootstrap UCL	0.846
95% Standard Bootstrap UCL	0.846	95% Bootstrap-t UCL	0.849
95% Hall's Bootstrap UCL	0.848	95% Percentile Bootstrap UCL	0.844
90% Chebyshev(Mean, Sd) UCL	0.876	95% Chebyshev(Mean, Sd) UCL	0.906
97.5% Chebyshev(Mean, Sd) UCL	0.947	99% Chebyshev(Mean, Sd) UCL	1.027

Suggested UCL to Use

95% Student's-t UCL	0.848

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Silver

General Statistics

Total Number of Observations	62	Number of Distinct Observations	54
		Number of Missing Observations	361
Minimum	0.096	Mean	0.234
Maximum	0.49	Median	0.208
SD	0.0967	Std. Error of Mean	0.0123
Coefficient of Variation	0.414	Skewness	0.84

Normal GOF Test

Shapiro Wilk Test Statistic	0.926	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0.0011	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.12	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.13	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.254	95% Adjusted-CLT UCL (Chen-1995)	0.255
		95% Modified-t UCL (Johnson-1978)	0.254

Gamma GOF Test

A-D Test Statistic	0.316	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0779	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.113	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	6.275	k star (bias corrected MLE)	5.982
Theta hat (MLE)	0.0372	Theta star (bias corrected MLE)	0.039
nu hat (MLE)	778.1	nu star (bias corrected)	741.8
MLE Mean (bias corrected)	0.234	MLE Sd (bias corrected)	0.0955
		Approximate Chi Square Value (0.05)	679.6
Adjusted Level of Significance	0.0461	Adjusted Chi Square Value	678.2

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.255	95% Adjusted Gamma UCL	0.255

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.972	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk P Value	0.356	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.0524	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.103	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-2.343	Mean of logged Data	-1.536
Maximum of Logged Data	-0.713	SD of logged Data	0.409

Assuming Lognormal Distribution

95% H-UCL	0.257	90% Chebyshev (MVUE) UCL	0.271
95% Chebyshev (MVUE) UCL	0.288	97.5% Chebyshev (MVUE) UCL	0.312
99% Chebyshev (MVUE) UCL	0.359		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.254	95% BCA Bootstrap UCL	0.255
95% Standard Bootstrap UCL	0.253	95% Bootstrap-t UCL	0.256
95% Hall's Bootstrap UCL	0.255	95% Percentile Bootstrap UCL	0.253
90% Chebyshev(Mean, Sd) UCL	0.27	95% Chebyshev(Mean, Sd) UCL	0.287
97.5% Chebyshev(Mean, Sd) UCL	0.31	99% Chebyshev(Mean, Sd) UCL	0.356

Suggested UCL to Use

95% Student's-t UCL	0.254

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Styrene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	12
		Number of Missing Observations	364
Number of Detects	9	Number of Non-Detects	5
Number of Distinct Detects	9	Number of Distinct Non-Detects	3
Minimum Detect	0.06	Minimum Non-Detect	0.01
Maximum Detect	5.5	Maximum Non-Detect	0.05
Variance Detects	5.077	Percent Non-Detects	35.71%
Mean Detects	1.336	SD Detects	2.253
Median Detects	0.29	CV Detects	1.687
Skewness Detects	1.616	Kurtosis Detects	0.771
Mean of Logged Detects	-1.064	SD of Logged Detects	1.694

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.594	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.764	Detected Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.442	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.316	Detected Data Not Normal at 1% Significance Level	

Detected Data Not Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.862	KM Standard Error of Mean	0.515
90KM SD	1.818	95% KM (BCA) UCL	1.64
95% KM (t) UCL	1.775	95% KM (Percentile Bootstrap) UCL	1.634
95% KM (z) UCL	1.71	95% KM Bootstrap t UCL	11.24
90% KM Chebyshev UCL	2.408	95% KM Chebyshev UCL	3.108
97.5% KM Chebyshev UCL	4.08	99% KM Chebyshev UCL	5.989

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.068	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.776	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.359	**Kolmogorov-Smirnov GOF**	
5% K-S Critical Value	0.295	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.473	k star (bias corrected MLE)	0.39
Theta hat (MLE)	2.822	Theta star (bias corrected MLE)	3.428
nu hat (MLE)	8.519	nu star (bias corrected)	7.013

Mean (detects)	1.336

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.862
Maximum	5.5	Median	0.08
SD	1.886	CV	2.188
k hat (MLE)	0.314	k star (bias corrected MLE)	0.294
Theta hat (MLE)	2.747	Theta star (bias corrected MLE)	2.93
nu hat (MLE)	8.789	nu star (bias corrected)	8.239
Adjusted Level of Significance (β)	0.0312		
Approximate Chi Square Value (8.24, α)	2.874	Adjusted Chi Square Value (8.24, β)	2.47
95% Gamma Approximate UCL	2.471	95% Gamma Adjusted UCL	2.875

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.862	SD (KM)	1.818
Variance (KM)	3.304	SE of Mean (KM)	0.515
k hat (KM)	0.225	k star (KM)	0.224
nu hat (KM)	6.298	nu star (KM)	6.282
theta hat (KM)	3.833	theta star (KM)	3.843
80% gamma percentile (KM)	1.2	90% gamma percentile (KM)	2.603
95% gamma percentile (KM)	4.306	99% gamma percentile (KM)	8.911

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (6.28, α)	1.786	Adjusted Chi Square Value (6.28, β)	1.487
95% KM Approximate Gamma UCL	3.033	95% KM Adjusted Gamma UCL	3.642

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.849	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.859	Detected Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.255	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.252	Detected Data Not Lognormal at 10% Significance Level

Detected Data Not Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.861	Mean in Log Scale	-2.58
SD in Original Scale	1.887	SD in Log Scale	2.521
95% t UCL (assumes normality of ROS data)	1.754	95% Percentile Bootstrap UCL	1.653
95% BCA Bootstrap UCL	1.985	95% Bootstrap t UCL	11.28
95% H-UCL (Log ROS)	100.9		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.329	KM Geo Mean	0.0974
KM SD (logged)	2.126	95% Critical H Value (KM-Log)	4.929
KM Standard Error of Mean (logged)	0.603	95% H-UCL (KM -Log)	17.06
KM SD (logged)	2.126	95% Critical H Value (KM-Log)	4.929
KM Standard Error of Mean (logged)	0.603		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.864	Mean in Log Scale	-2.228
SD in Original Scale	1.885	SD in Log Scale	2.128
95% t UCL (Assumes normality)	1.757	95% H-Stat UCL	19.06

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 1.775

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Tetrachloroethene (PCE)

General Statistics

Total Number of Observations	18	Number of Distinct Observations	16
		Number of Missing Observations	409
Number of Detects	13	Number of Non-Detects	5
Number of Distinct Detects	13	Number of Distinct Non-Detects	3
Minimum Detect	0.05	Minimum Non-Detect	0.01
Maximum Detect	0.6	Maximum Non-Detect	1.1
Variance Detects	0.0272	Percent Non-Detects	27.78%
Mean Detects	0.28	SD Detects	0.165
Median Detects	0.25	CV Detects	0.589
Skewness Detects	0.779	Kurtosis Detects	0.258
Mean of Logged Detects	-1.464	SD of Logged Detects	0.701

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.928	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.173	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.244	KM Standard Error of Mean	0.0467
90KM SD	0.174	95% KM (BCA) UCL	0.323
95% KM (t) UCL	0.325	95% KM (Percentile Bootstrap) UCL	0.322
95% KM (z) UCL	0.321	95% KM Bootstrap t UCL	0.334
90% KM Chebyshev UCL	0.384	95% KM Chebyshev UCL	0.447
97.5% KM Chebyshev UCL	0.535	99% KM Chebyshev UCL	0.708

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.242	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.74	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.135	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.239	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.768	k star (bias corrected MLE)	2.18
Theta hat (MLE)	0.101	Theta star (bias corrected MLE)	0.128
nu hat (MLE)	71.96	nu star (bias corrected)	56.69
Mean (detects)	0.28		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.241
Maximum	0.6	Median	0.222
SD	0.169	CV	0.702
k hat (MLE)	1.346	k star (bias corrected MLE)	1.159
Theta hat (MLE)	0.179	Theta star (bias corrected MLE)	0.208
nu hat (MLE)	48.45	nu star (bias corrected)	41.71
Adjusted Level of Significance (β)	0.0357		
Approximate Chi Square Value (41.71, α)	27.9	Adjusted Chi Square Value (41.71, β)	26.82
95% Gamma Approximate UCL	0.361	95% Gamma Adjusted UCL	0.375

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.244	SD (KM)	0.174
Variance (KM)	0.0302	SE of Mean (KM)	0.0467
k hat (KM)	1.974	k star (KM)	1.682
nu hat (KM)	71.07	nu star (KM)	60.56
theta hat (KM)	0.124	theta star (KM)	0.145
80% gamma percentile (KM)	0.373	90% gamma percentile (KM)	0.495
95% gamma percentile (KM)	0.612	99% gamma percentile (KM)	0.875

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (60.56, α)	43.66	Adjusted Chi Square Value (60.56, β)	42.29
95% KM Approximate Gamma UCL	0.338	95% KM Adjusted Gamma UCL	0.349

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.889	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.177	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.215	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.243	Mean in Log Scale	-1.672
SD in Original Scale	0.163	SD in Log Scale	0.802
95% t UCL (assumes normality of ROS data)	0.31	95% Percentile Bootstrap UCL	0.305
95% BCA Bootstrap UCL	0.308	95% Bootstrap t UCL	0.321
95% H-UCL (Log ROS)	0.41		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-1.883	KM Geo Mean	0.152
KM SD (logged)	1.238	95% Critical H Value (KM-Log)	3.002
KM Standard Error of Mean (logged)	0.333	95% H-UCL (KM -Log)	0.806
KM SD (logged)	1.238	95% Critical H Value (KM-Log)	3.002
KM Standard Error of Mean (logged)	0.333		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.295	Mean in Log Scale	-1.681
SD in Original Scale	0.201	SD in Log Scale	1.309
95% t UCL (Assumes normality)	0.377	95% H-Stat UCL	1.179

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.325

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Thallium

General Statistics

Total Number of Observations	54	Number of Distinct Observations	13
		Number of Missing Observations	367
Number of Detects	17	Number of Non-Detects	37
Number of Distinct Detects	12	Number of Distinct Non-Detects	3
Minimum Detect	0.003	Minimum Non-Detect	0.002
Maximum Detect	0.052	Maximum Non-Detect	0.009
Variance Detects	1.2531E-4	Percent Non-Detects	68.52%
Mean Detects	0.0139	SD Detects	0.0112
Median Detects	0.012	CV Detects	0.803
Skewness Detects	2.585	Kurtosis Detects	8.769
Mean of Logged Detects	-4.511	SD of Logged Detects	0.716

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.724	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.851	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.235	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.241	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00618	KM Standard Error of Mean	0.00116
90KM SD	0.00812	95% KM (BCA) UCL	0.0081
95% KM (t) UCL	0.00812	95% KM (Percentile Bootstrap) UCL	0.00811
95% KM (z) UCL	0.00809	95% KM Bootstrap t UCL	0.00911
90% KM Chebyshev UCL	0.00966	95% KM Chebyshev UCL	0.0112
97.5% KM Chebyshev UCL	0.0134	99% KM Chebyshev UCL	0.0177

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.516	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.748	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.155	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.211	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.25	k star (bias corrected MLE)	1.892
Theta hat (MLE)	0.0062	Theta star (bias corrected MLE)	0.00737
nu hat (MLE)	76.48	nu star (bias corrected)	64.32
Mean (detects)	0.0139		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)
For such situations, GROS method may yield incorrect values of UCLs and BTVs
This is especially true when the sample size is small.
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.003	Mean	0.0112
Maximum	0.052	Median	0.01
SD	0.00642	CV	0.571
k hat (MLE)	5.881	k star (bias corrected MLE)	5.567
Theta hat (MLE)	0.00191	Theta star (bias corrected MLE)	0.00202
nu hat (MLE)	635.2	nu star (bias corrected)	601.2
Adjusted Level of Significance (β)	0.0456		

Approximate Chi Square Value (601.20, α)	545.3	Adjusted Chi Square Value (601.20, β)	543.9
95% Gamma Approximate UCL	0.0124	95% Gamma Adjusted UCL	0.0124

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00618	SD (KM)	0.00812
Variance (KM)	6.5921E-5	SE of Mean (KM)	0.00116
k hat (KM)	0.579	k star (KM)	0.559
nu hat (KM)	62.53	nu star (KM)	60.39
theta hat (KM)	0.0107	theta star (KM)	0.011
80% gamma percentile (KM)	0.0102	90% gamma percentile (KM)	0.0163
95% gamma percentile (KM)	0.0228	99% gamma percentile (KM)	0.0386

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (60.39, α)	43.52	Adjusted Chi Square Value (60.39, β)	43.13
95% KM Approximate Gamma UCL	0.00857	95% KM Adjusted Gamma UCL	0.00865

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.94	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.91	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.148	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.19	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0059	Mean in Log Scale	-5.806
SD in Original Scale	0.00836	SD in Log Scale	1.173
95% t UCL (assumes normality of ROS data)	0.00781	95% Percentile Bootstrap UCL	0.0079
95% BCA Bootstrap UCL	0.00828	95% Bootstrap t UCL	0.00867
95% H-UCL (Log ROS)	0.00903		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.549	KM Geo Mean	0.00389
KM SD (logged)	0.856	95% Critical H Value (KM-Log)	2.172
KM Standard Error of Mean (logged)	0.137	95% H-UCL (KM -Log)	0.00725
KM SD (logged)	0.856	95% Critical H Value (KM-Log)	2.172
KM Standard Error of Mean (logged)	0.137		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00682	Mean in Log Scale	-5.389
SD in Original Scale	0.00794	SD in Log Scale	0.892
95% t UCL (Assumes normality)	0.00863	95% H-Stat UCL	0.00891

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00812

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Toluene

General Statistics

Total Number of Observations	25	Number of Distinct Observations	23
		Number of Missing Observations	402
Minimum	3.8	Mean	7.733
Maximum	16	Median	6.7
SD	3.217	Std. Error of Mean	0.643
Coefficient of Variation	0.416	Skewness	1.776

Normal GOF Test

Shapiro Wilk Test Statistic	0.767	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.886	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.246	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.201	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	8.834	95% Adjusted-CLT UCL (Chen-1995)	9.036
		95% Modified-t UCL (Johnson-1978)	8.872

Gamma GOF Test

A-D Test Statistic	1.275	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.189	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.175	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	7.77	k star (bias corrected MLE)	6.864
Theta hat (MLE)	0.995	Theta star (bias corrected MLE)	1.127
nu hat (MLE)	388.5	nu star (bias corrected)	343.2
MLE Mean (bias corrected)	7.733	MLE Sd (bias corrected)	2.952
		Approximate Chi Square Value (0.05)	301.3
Adjusted Level of Significance	0.0395	Adjusted Chi Square Value	298.6

Assuming Gamma Distribution

95% Approximate Gamma UCL	8.809	95% Adjusted Gamma UCL	8.888

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.906	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.931	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.165	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.159	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.335	Mean of logged Data	1.98
Maximum of Logged Data	2.773	SD of logged Data	0.353

Assuming Lognormal Distribution

95% H-UCL	8.803	90% Chebyshev (MVUE) UCL	9.347
95% Chebyshev (MVUE) UCL	10.1	97.5% Chebyshev (MVUE) UCL	11.14
99% Chebyshev (MVUE) UCL	13.2		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	8.792	95% BCA Bootstrap UCL	9.021
95% Standard Bootstrap UCL	8.769	95% Bootstrap-t UCL	9.298

95% Hall's Bootstrap UCL	9.038	95% Percentile Bootstrap UCL	8.82
90% Chebyshev(Mean, Sd) UCL	9.664	95% Chebyshev(Mean, Sd) UCL	10.54
97.5% Chebyshev(Mean, Sd) UCL	11.75	99% Chebyshev(Mean, Sd) UCL	14.14

Suggested UCL to Use

95% Student's-t UCL 8.834

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Total PAHs

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	393
Minimum	4.204	Mean	5.779
Maximum	8.178	Median	5.32
SD	1.458	Std. Error of Mean	0.486
Coefficient of Variation	0.252	Skewness	0.699

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.886	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.234	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	6.682	95% Adjusted-CLT UCL (Chen-1995)	6.699
		95% Modified-t UCL (Johnson-1978)	6.701

Gamma GOF Test

A-D Test Statistic	0.452	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.721	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.211	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.279	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics

k hat (MLE)	18.7	k star (bias corrected MLE)	12.54
Theta hat (MLE)	0.309	Theta star (bias corrected MLE)	0.461
nu hat (MLE)	336.7	nu star (bias corrected)	225.8
MLE Mean (bias corrected)	5.779	MLE Sd (bias corrected)	1.632
		Approximate Chi Square Value (0.05)	192
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	185.4

Assuming Gamma Distribution

95% Approximate Gamma UCL	6.795	95% Adjusted Gamma UCL	7.036

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.194	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.252	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	1.436	Mean of logged Data	1.727
Maximum of Logged Data	2.101	SD of logged Data	0.243

Assuming Lognormal Distribution

95% H-UCL	6.853	90% Chebyshev (MVUE) UCL	7.186
95% Chebyshev (MVUE) UCL	7.825	97.5% Chebyshev (MVUE) UCL	8.712
99% Chebyshev (MVUE) UCL	10.45		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	6.578	95% BCA Bootstrap UCL	6.582
95% Standard Bootstrap UCL	6.531	95% Bootstrap-t UCL	6.878
95% Hall's Bootstrap UCL	6.527	95% Percentile Bootstrap UCL	6.532
90% Chebyshev(Mean, Sd) UCL	7.237	95% Chebyshev(Mean, Sd) UCL	7.897
97.5% Chebyshev(Mean, Sd) UCL	8.814	99% Chebyshev(Mean, Sd) UCL	10.61

Suggested UCL to Use

95% Student's-t UCL	6.682

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Total Suspended Solids (TSS)

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	422
Minimum	64000	Mean	67000
Maximum	70000	Median	67000

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Total Suspended Solids (TSS) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Trichloroethene (TCE)

General Statistics

Total Number of Observations	18	Number of Distinct Observations	7
		Number of Missing Observations	409
Number of Detects	2	Number of Non-Detects	16
Number of Distinct Detects	2	Number of Distinct Non-Detects	5
Minimum Detect	0.06	Minimum Non-Detect	0.01
Maximum Detect	0.07	Maximum Non-Detect	1.8

Variance Detects	5.0000E-5	Percent Non-Detects	88.89%
Mean Detects	0.065	SD Detects	0.00707
Median Detects	0.065	CV Detects	0.109
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-2.736	SD of Logged Detects	0.109

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0238	KM Standard Error of Mean	0.012
90KM SD	0.0239	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0446	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0434	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0597	95% KM Chebyshev UCL	0.0759
97.5% KM Chebyshev UCL	0.0985	99% KM Chebyshev UCL	0.143

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	168.7	k star (bias corrected MLE)	N/A
Theta hat (MLE)	3.8538E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	674.7	nu star (bias corrected)	N/A
Mean (detects)	0.065		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0238	SD (KM)	0.0239
Variance (KM)	5.7344E-4	SE of Mean (KM)	0.012
k hat (KM)	0.984	k star (KM)	0.857
nu hat (KM)	35.41	nu star (KM)	30.84
theta hat (KM)	0.0241	theta star (KM)	0.0277
80% gamma percentile (KM)	0.0387	90% gamma percentile (KM)	0.0568
95% gamma percentile (KM)	0.0752	99% gamma percentile (KM)	0.118

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0357
Approximate Chi Square Value (30.84, α)	19.16	Adjusted Chi Square Value (30.84, β)	18.27
95% KM Approximate Gamma UCL	0.0382	95% KM Adjusted Gamma UCL	0.0401

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0436	Mean in Log Scale	-3.167
SD in Original Scale	0.0119	SD in Log Scale	0.264
95% t UCL (assumes normality of ROS data)	0.0484	95% Percentile Bootstrap UCL	0.0483
95% BCA Bootstrap UCL	0.0486	95% Bootstrap t UCL	0.0492
95% H-UCL (Log ROS)	0.049		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.138	KM Geo Mean	0.016
KM SD (logged)	0.81	95% Critical H Value (KM-Log)	2.375
KM Standard Error of Mean (logged)	0.405	95% H-UCL (KM -Log)	0.0353
KM SD (logged)	0.81	95% Critical H Value (KM-Log)	2.375
KM Standard Error of Mean (logged)	0.405		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.186	Mean in Log Scale	-2.927
SD in Original Scale	0.331	SD in Log Scale	1.541
95% t UCL (Assumes normality)	0.322	95% H-Stat UCL	0.65

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 0.0446

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Vinyl Chloride

General Statistics

Total Number of Observations	18	Number of Distinct Observations	6
		Number of Missing Observations	409
Number of Detects	1	Number of Non-Detects	17
Number of Distinct Detects	1	Number of Distinct Non-Detects	5

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Vinyl Chloride was not processed!

Zinc

General Statistics

Total Number of Observations	62	Number of Distinct Observations	45
		Number of Missing Observations	361
Minimum	57.2	Mean	103.5
Maximum	165	Median	106
SD	21.55	Std. Error of Mean	2.737
Coefficient of Variation	0.208	Skewness	-0.0167

Normal GOF Test

Shapiro Wilk Test Statistic	0.972	**Shapiro Wilk GOF Test**
1% Shapiro Wilk P Value	0.356	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.0918	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.13	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	108.1	95% Adjusted-CLT UCL (Chen-1995)	108
		95% Modified-t UCL (Johnson-1978)	108.1

Gamma GOF Test

A-D Test Statistic	1.024	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.749	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.119	**Kolmogorov-Smirnov Gamma GOF Test**

5% K-S Critical Value	0.113	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	21.9	k star (bias corrected MLE)	20.85
Theta hat (MLE)	4.727	Theta star (bias corrected MLE)	4.965
nu hat (MLE)	2715	nu star (bias corrected)	2585
MLE Mean (bias corrected)	103.5	MLE Sd (bias corrected)	22.67
		Approximate Chi Square Value (0.05)	2468
Adjusted Level of Significance	0.0461	Adjusted Chi Square Value	2466

Assuming Gamma Distribution

95% Approximate Gamma UCL	108.4	95% Adjusted Gamma UCL	108.6

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.942	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk P Value	0.0097	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.131	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.103	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.047	Mean of logged Data	4.617
Maximum of Logged Data	5.106	SD of logged Data	0.222

Assuming Lognormal Distribution

95% H-UCL	108.9	90% Chebyshev (MVUE) UCL	112.5
95% Chebyshev (MVUE) UCL	116.5	97.5% Chebyshev (MVUE) UCL	122.1
99% Chebyshev (MVUE) UCL	133		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	108	95% BCA Bootstrap UCL	108
95% Standard Bootstrap UCL	108	95% Bootstrap-t UCL	108.2
95% Hall's Bootstrap UCL	108.3	95% Percentile Bootstrap UCL	107.9
90% Chebyshev(Mean, Sd) UCL	111.7	95% Chebyshev(Mean, Sd) UCL	115.5
97.5% Chebyshev(Mean, Sd) UCL	120.6	99% Chebyshev(Mean, Sd) UCL	130.8

Suggested UCL to Use

95% Student's-t UCL	108.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 12/16/2024 9:29:12 AM
From File	CEC UCL Input.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,7-Dimethylxanthine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	16.2	Mean	37
Maximum	57.8	Median	37

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 1,7-Dimethylxanthine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

10-hydroxy-amitriptyline

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0113	Mean	0.0153
Maximum	0.0192	Median	0.0153

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 10-hydroxy-amitriptyline was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

17 beta-Estradiol

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	2
Minimum	0.00552	Mean	0.00552
Maximum	0.00552	Median	0.00552

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 17 beta-Estradiol was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',3,3',4,4',5,5',6,6'-DeBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	0.0258	Mean	0.0258
Maximum	0.0258	Median	0.0258

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',3,3',4,4',5,5',6,6'-DeBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',3,3',4,4',5,6,6'-NoBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	0.00524	Mean	0.00524
Maximum	0.00524	Median	0.00524

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',3,3',4,4',5,6,6'-NoBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',3,4,4',5,5',6-OcBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	0.00141	Mean	0.00141
Maximum	0.00141	Median	0.00141

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',3,4,4',5,5',6-OcBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',3,4,4',5',6-HpBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	6.8700E-4	Mean	6.8700E-4
Maximum	6.8700E-4	Median	6.8700E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',3,4,4',5',6-HpBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',3,4,4',5'-HxBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	4.9400E-4	Mean	4.9400E-4
Maximum	4.9400E-4	Median	4.9400E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',3,4,4',5'-HxBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',3,4,4',6'-HxBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	1.5400E-4	Mean	1.5400E-4
Maximum	1.5400E-4	Median	1.5400E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',3,4,4',6'-HxBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',3,4,4'-PeBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	0.00182	Mean	0.00182
Maximum	0.00182	Median	0.00182

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',3,4,4'-PeBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',4,4',5,5'-HxBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	0.0036	Mean	0.0036
Maximum	0.0036	Median	0.0036

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',4,4',5,5'-HxBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',4,4',5,6'-HxBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	0.00305	Mean	0.00305
Maximum	0.00305	Median	0.00305

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',4,4',5,6'-HxBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',4,4',5-PeBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	0.0406	Mean	0.0406
Maximum	0.0406	Median	0.0406

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',4,4',5-PeBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',4,4',6,6'-HxBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	2.1300E-4	Mean	2.1300E-4
Maximum	2.1300E-4	Median	2.1300E-4

Warning: This data set only has 1 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',4,4',6,6'-HxBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',4,4',6-PeBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	0.00811	Mean	0.00811
Maximum	0.00811	Median	0.00811

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',4,4',6-PeBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',4,4'-TeBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	0.0432	Mean	0.0432
Maximum	0.0432	Median	0.0432

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',4,4'-TeBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',4,5'-TeBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	0.00156	Mean	0.00156
Maximum	0.00156	Median	0.00156

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',4,5'-TeBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',4,6'-TeBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	2.4000E-4	Mean	2.4000E-4
Maximum	2.4000E-4	Median	2.4000E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',4,6'-TeBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,2',4-TriBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	0.00111	Mean	0.00111
Maximum	0.00111	Median	0.00111

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,2',4-TriBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,3',4,4',6-PeBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	2.0200E-4	Mean	2.0200E-4
Maximum	2.0200E-4	Median	2.0200E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,3',4,4',6-PeBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,3',4,4'-TeBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	0.0015	Mean	0.0015
Maximum	0.0015	Median	0.0015

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable 2,3',4,4'-TeBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,3',4',6-TeBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	5.5800E-4	Mean	5.5800E-4
Maximum	5.5800E-4	Median	5.5800E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,3',4',6-TeBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,4,4'-TriBDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	8
Minimum	0.00135	Mean	0.00135
Maximum	0.00135	Median	0.00135

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,4,4'-TriBDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2,4'-DDD

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	6
Minimum	0.00107	Mean	0.00107
Maximum	0.00107	Median	0.00107

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2,4'-DDD was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

2-Hydroxy-ibuprofen

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	11
Minimum	38.7	Mean	38.7
Maximum	38.7	Median	38.7

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 2-Hydroxy-ibuprofen was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

4,4'-DDE

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	6
Minimum	6.3100E-4	Mean	6.3100E-4
Maximum	6.3100E-4	Median	6.3100E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 4,4'-DDE was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

4,4'-DDT

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	5
Minimum	1.8600E-4	Mean	1.8600E-4
Maximum	1.8600E-4	Median	1.8600E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 4,4'-DDT was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

4-Epitetracycline [ETC]

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	12
Minimum	0.0662	Mean	0.0662
Maximum	0.0662	Median	0.0662

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 4-Epitetracycline [ETC] was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

4-Nonylphenol diethoxylates

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	6
Minimum	1.47	Mean	3.735
Maximum	6	Median	3.735

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 4-Nonylphenol diethoxylates was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

4-Nonylphenol monoethoxylates

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	6
Minimum	10.1	Mean	10.2
Maximum	10.3	Median	10.2

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 4-Nonylphenol monoethoxylates was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

4-Nonylphenols

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	6
Minimum	5.67	Mean	10.14
Maximum	14.6	Median	10.14

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 4-Nonylphenols was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

5:3 FTCA

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	3
Minimum	0.0592	Mean	0.0592
Maximum	0.0592	Median	0.0592

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 5:3 FTCA was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

6PPD-Quinone

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	4
Minimum	0.0053	Mean	0.0053
Maximum	0.0053	Median	0.0053

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable 6PPD-Quinone was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Acetaminophen

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	67.5	Mean	94.75
Maximum	122	Median	94.75

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Acetaminophen was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Albuterol

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0145	Mean	0.0173
Maximum	0.0201	Median	0.0173

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Albuterol was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Alprazolam

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	8.7100E-4	Mean	0.00205
Maximum	0.00323	Median	0.00205

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Alprazolam was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Amitriptyline

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0294	Mean	0.052
Maximum	0.0746	Median	0.052

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Amitriptyline was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Amlodipine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0188	Mean	0.0218
Maximum	0.0248	Median	0.0218

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Amlodipine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Amphetamine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2

		Number of Missing Observations	11
Minimum	0.304	Mean	0.422
Maximum	0.539	Median	0.422

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Amphetamine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Androstenedione

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	2
Minimum	0.162	Mean	0.162
Maximum	0.162	Median	0.162

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Androstenedione was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Androsterone

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	2
Minimum	0.0571	Mean	0.0571
Maximum	0.0571	Median	0.0571

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Androsterone was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Atenolol

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.381	Mean	1.131
Maximum	1.88	Median	1.131

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Atenolol was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Atorvastatin

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	0.0604	Mean	0.14
Maximum	0.22	Median	0.14

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Atorvastatin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Azithromycin

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.112	Mean	0.227
Maximum	0.341	Median	0.227

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Azithromycin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Benzoylecgonine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	1.92	Mean	1.94
Maximum	1.96	Median	1.94

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Benzoylecgonine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Benztropine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Number of Detects	1	Number of Non-Detects	1

Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Benztropine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Bisphenol A

General Statistics

Total Number of Observations	3	Number of Distinct Observations	3
		Number of Missing Observations	10
Minimum	0.55	Mean	1.143
Maximum	1.59	Median	1.29
SD	0.535	Std. Error of Mean	0.309
Coefficient of Variation	0.468	Skewness	-1.14

Note: Sample size is small (e.g., <10), if data are collected using incremental sampling methodology (ISM) approach,
refer also to ITRC Tech Reg Guide on ISM (ITRC 2020 and ITRC 2012) for additional guidance,
but note that ITRC may recommend the t-UCL or the Chebyshev UCL for small sample sizes (n < 7).
The Chebyshev UCL often results in gross overestimates of the mean.
Refer to the ProUCL 5.2 Technical Guide for a discussion of the Chebyshev UCL.

Normal GOF Test

Shapiro Wilk Test Statistic	0.944	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.275	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	2.046	95% Adjusted-CLT UCL (Chen-1995)	1.434
		95% Modified-t UCL (Johnson-1978)	2.012

Gamma GOF Test

A-D Test Statistic	0.377	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.637	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.333	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.433	Detected data appear Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.494	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.208	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	32.96	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A
		Approximate Chi Square Value (0.05)	N/A
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL	N/A	95% Adjusted Gamma UCL	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.891	**Shapiro Wilk Lognormal GOF Test**

10% Shapiro Wilk Critical Value	0.789	Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.315	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.389	Data appear Lognormal at 10% Significance Level	

Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal Statistics

Minimum of Logged Data	-0.598	Mean of logged Data	0.0402
Maximum of Logged Data	0.464	SD of logged Data	0.562

Assuming Lognormal Distribution

95% H-UCL	22.3	90% Chebyshev (MVUE) UCL	2.235
95% Chebyshev (MVUE) UCL	2.725	97.5% Chebyshev (MVUE) UCL	3.405
99% Chebyshev (MVUE) UCL	4.741		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	1.652	95% BCA Bootstrap UCL	N/A
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
90% Chebyshev(Mean, Sd) UCL	2.07	95% Chebyshev(Mean, Sd) UCL	2.49
97.5% Chebyshev(Mean, Sd) UCL	3.073	99% Chebyshev(Mean, Sd) UCL	4.218

Suggested UCL to Use

95% Student's-t UCL	2.046

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Bisphenol S

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	1
Minimum	0.888	Mean	0.888
Maximum	0.888	Median	0.888

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Bisphenol S was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Caffeine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	45.1	Mean	75.05

Maximum	105	Median	75.05

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Caffeine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Carbamazepine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	0.112	Mean	0.309
Maximum	0.506	Median	0.309

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Carbamazepine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Chlordane, alpha (cis)

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	6
Minimum	1.4200E-4	Mean	1.4200E-4
Maximum	1.4200E-4	Median	1.4200E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Chlordane, alpha (cis) was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Chlorpyriphos

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	6
Minimum	9.7200E-4	Mean	9.7200E-4
Maximum	9.7200E-4	Median	9.7200E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Chlorpyriphos was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Chlorpyriphos-Methyl

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	6
Minimum	2.1100E-4	Mean	2.1100E-4
Maximum	2.1100E-4	Median	2.1100E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Chlorpyriphos-Methyl was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Ciprofloxacin

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	0.102	Mean	0.237
Maximum	0.372	Median	0.237

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Ciprofloxacin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Clarithromycin

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0407	Mean	0.103
Maximum	0.165	Median	0.103

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Clarithromycin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Cocaine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.568	Mean	0.668
Maximum	0.768	Median	0.668

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Cocaine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Codeine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0583	Mean	0.105
Maximum	0.152	Median	0.105

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Codeine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Cotinine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	2.1	Mean	2.45
Maximum	2.8	Median	2.45

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Cotinine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Cypermethrin

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	5
Minimum	0.00405	Mean	0.00405
Maximum	0.00405	Median	0.00405

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Cypermethrin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

DEET

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	3.65	Mean	5.005
Maximum	6.36	Median	5.005

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable DEET was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Dehydronifedipine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Dehydronifedipine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Desmethyldiltiazem

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0302	Mean	0.0569
Maximum	0.0836	Median	0.0569

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Desmethyldiltiazem was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Diazepam

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	2
Minimum	8.2700E-4	Mean	8.2700E-4
Maximum	8.2700E-4	Median	8.2700E-4

Warning: This data set only has 1 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Diazepam was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Dieldrin

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	6
Minimum	2.7400E-4	Mean	2.7400E-4
Maximum	2.7400E-4	Median	2.7400E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Dieldrin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Digoxin

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Digoxin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Diltiazem

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0961	Mean	0.251
Maximum	0.406	Median	0.251

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Diltiazem was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Diphenhydramine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.593	Mean	1.137
Maximum	1.68	Median	1.137

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Diphenhydramine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Doxycycline

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	12
Minimum	0.15	Mean	0.15
Maximum	0.15	Median	0.15

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Doxycycline was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Enalapril

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.00595	Mean	0.00903
Maximum	0.0121	Median	0.00903

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Enalapril was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Endrin

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	5
Minimum	6.2000E-5	Mean	6.2000E-5
Maximum	6.2000E-5	Median	6.2000E-5

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Endrin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Enrofloxacin

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Enrofloxacin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Equilenin

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	2
Minimum	0.0134	Mean	0.0134
Maximum	0.0134	Median	0.0134

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Equilenin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Erythromycin-H2O

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.012	Mean	0.09
Maximum	0.168	Median	0.09

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Erythromycin-H2O was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Estrone

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1

		Number of Missing Observations	2
Minimum	0.0331	Mean	0.0331
Maximum	0.0331	Median	0.0331

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Estrone was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Fluoxetine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0286	Mean	0.0403
Maximum	0.052	Median	0.0403

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Fluoxetine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Furosemide

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	0.202	Mean	0.205
Maximum	0.208	Median	0.205

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Furosemide was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Gemfibrozil

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	0.183	Mean	0.757
Maximum	1.33	Median	0.757

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Gemfibrozil was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Glipizide

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.00458	Mean	0.00764
Maximum	0.0107	Median	0.00764

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Glipizide was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Glyburide

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Glyburide was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

HCH, alpha

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	6
Minimum	6.6000E-5	Mean	6.6000E-5
Maximum	6.6000E-5	Median	6.6000E-5

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable HCH, alpha was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

HCH, beta

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	5
Minimum	1.0900E-4	Mean	1.0900E-4

Maximum	1.0900E-4	Median	1.0900E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable HCH, beta was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

HCH, gamma

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	5
Minimum	6.9600E-4	Mean	6.9600E-4
Maximum	6.9600E-4	Median	6.9600E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable HCH, gamma was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Hexachlorobenzene

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	6
Minimum	5.1700E-4	Mean	5.1700E-4
Maximum	5.1700E-4	Median	5.1700E-4

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Hexachlorobenzene was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Hydrochlorothiazide

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.355	Mean	0.713
Maximum	1.07	Median	0.713

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Hydrochlorothiazide was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Hydrocodone

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0259	Mean	0.0473
Maximum	0.0687	Median	0.0473

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Hydrocodone was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Hydrocortisone

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	0.207	Mean	0.495
Maximum	0.782	Median	0.495

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Hydrocortisone was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Ibuprofen

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	8.15	Mean	14.53
Maximum	20.9	Median	14.53

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Ibuprofen was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Lincomycin

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	0.00436	Mean	0.0239
Maximum	0.0435	Median	0.0239

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Lincomycin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Meprobamate

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0168	Mean	0.2
Maximum	0.383	Median	0.2

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Meprobamate was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Metformin

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	45.9	Mean	67.6
Maximum	89.3	Median	67.6

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Metformin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Methylprednisolone

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Methylprednisolone was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Metoprolol

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.46	Mean	0.475
Maximum	0.489	Median	0.475

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Metoprolol was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Miconazole

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.00197	Mean	0.0291
Maximum	0.0562	Median	0.0291

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Miconazole was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Naproxen

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	6.25	Mean	9.325
Maximum	12.4	Median	9.325

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Naproxen was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Norfluoxetine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.00789	Mean	0.0176
Maximum	0.0273	Median	0.0176

Warning: This data set only has 2 observations!

Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Norfluoxetine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Norgestrel

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	2
Minimum	0.0818	Mean	0.0818
Maximum	0.0818	Median	0.0818

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Norgestrel was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Norverapamil

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.00595	Mean	0.0124
Maximum	0.0189	Median	0.0124

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Norverapamil was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Ofloxacin

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0879	Mean	0.257
Maximum	0.427	Median	0.257

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Ofloxacin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Oxycodone

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	0.0559	Mean	0.108
Maximum	0.16	Median	0.108

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Oxycodone was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Paroxetine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	0.00352	Mean	0.0112
Maximum	0.0188	Median	0.0112

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Paroxetine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Penicillin V

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Penicillin V was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Permethrin

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	6
Minimum	0.0423	Mean	0.0423
Maximum	0.0423	Median	0.0423

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Permethrin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

PFBA

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	8
Minimum	0.00504	Mean	0.00997
Maximum	0.0149	Median	0.00997

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable PFBA was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

PFHpA

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	8
Minimum	0.00721	Mean	0.00784
Maximum	0.00847	Median	0.00784

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable PFHpA was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

PFHxA

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	8
Minimum	0.0228	Mean	0.0242
Maximum	0.0255	Median	0.0242

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable PFHxA was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

PFHxS

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	9
Minimum	0.0255	Mean	0.0326
Maximum	0.0396	Median	0.0326

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable PFHxS was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

PFNA

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	9
Minimum	0.00268	Mean	0.00391
Maximum	0.00514	Median	0.00391

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable PFNA was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

PFOA

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	8
Minimum	0.0173	Mean	0.0179
Maximum	0.0185	Median	0.0179

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable PFOA was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

PFOS

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	9
Minimum	0.024	Mean	0.0447
Maximum	0.0653	Median	0.0447

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable PFOS was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

PFPeA

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	8
Minimum	0.00878	Mean	0.0145
Maximum	0.0203	Median	0.0145

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable PFPeA was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

PFPeS

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	3
Minimum	0.00384	Mean	0.00384
Maximum	0.00384	Median	0.00384

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable PFPeS was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Prednisolone

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Prednisolone was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Prednisone

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11

Minimum	0.00729	Mean	0.206
Maximum	0.404	Median	0.206

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Prednisone was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Progesterone

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	2
Minimum	0.0566	Mean	0.0566
Maximum	0.0566	Median	0.0566

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Progesterone was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Promethazine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Promethazine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Propoxyphene

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Propoxyphene was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Propranolol

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0611	Mean	0.068
Maximum	0.0748	Median	0.068

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Propranolol was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Ranitidine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Ranitidine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Roxithromycin

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Roxithromycin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Sertraline

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	0.0483	Mean	0.0782
Maximum	0.108	Median	0.0782

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!

The data set for variable Sertraline was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Sulfadiazine

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Sulfadiazine was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Sulfamethizole

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Sulfamethizole was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Sulfamethoxazole

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	0.416	Mean	0.748
Maximum	1.08	Median	0.748

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Sulfamethoxazole was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Sulfanilamide

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2

		Number of Missing Observations	11
Minimum	0.0323	Mean	0.0336
Maximum	0.0348	Median	0.0336

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Sulfanilamide was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Testosterone

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	2
Minimum	0.0717	Mean	0.0717
Maximum	0.0717	Median	0.0717

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Testosterone was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Tetracycline [TC]

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	12
Minimum	0.0979	Mean	0.0979
Maximum	0.0979	Median	0.0979

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Tetracycline [TC] was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Theophylline

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	48.4	Mean	49.75
Maximum	51.1	Median	49.75

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Theophylline was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!

If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Thiabendazole

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.024	Mean	0.0273
Maximum	0.0306	Median	0.0273

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Thiabendazole was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Triamterene

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	0.0349	Mean	0.0645
Maximum	0.0941	Median	0.0645

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Triamterene was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Triclocarban

General Statistics

Total Number of Observations	1	Number of Distinct Observations	1
		Number of Missing Observations	2
Minimum	0.00489	Mean	0.00489
Maximum	0.00489	Median	0.00489

Warning: This data set only has 1 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Triclocarban was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Triclosan

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Number of Detects	1	Number of Non-Detects	1

Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Triclosan was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Trimethoprim

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	0.294	Mean	0.503
Maximum	0.711	Median	0.503

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Trimethoprim was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Tylosin

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Tylosin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Valsartan

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	11
Minimum	2.48	Mean	9.14
Maximum	15.8	Median	9.14

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Valsartan was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Verapamil

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Minimum	0.0103	Mean	0.0308
Maximum	0.0512	Median	0.0308

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Verapamil was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

Warfarin

General Statistics

Total Number of Observations	2	Number of Distinct Observations	2
		Number of Missing Observations	10
Number of Detects	1	Number of Non-Detects	1
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: This data set only has 2 observations!
Data set is too small to compute reliable and meaningful statistics and estimates!
The data set for variable Warfarin was not processed!

It is suggested to collect at least 8 to 10 observations before using these statistical methods!
If possible, compute and collect Data Quality Objectives (DQO) based sample size and analytical results.

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	ProUCL 5.2 1/31/2025 3:09:36 PM
From File	AWWU Fish Tissue UCL Worksheetsxxx.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

1,2,4-Trichlorobenzene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 1,2,4-Trichlorobenzene was not processed!

1,2-Diphenylhydrazine

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 1,2-Diphenylhydrazine was not processed!

2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)

General Statistics

Total Number of Observations	15	Number of Distinct Observations	5
		Number of Missing Observations	1
Number of Detects	0	Number of Non-Detects	15
Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) was not processed!

2,4,6-Trichlorophenol

General Statistics

Total Number of Observations	16	Number of Distinct Observations	6
Number of Detects	2	Number of Non-Detects	14
Number of Distinct Detects	2	Number of Distinct Non-Detects	4
Minimum Detect	0.0092	Minimum Non-Detect	0.037
Maximum Detect	0.029	Maximum Non-Detect	0.04

Variance Detects	1.9602E-4	Percent Non-Detects	87.5%
Mean Detects	0.0191	SD Detects	0.014
Median Detects	0.0191	CV Detects	0.733
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-4.115	SD of Logged Detects	0.812

Warning: Data set has only 2 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0191	KM Standard Error of Mean	0.0099
90KM SD	0.0099	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0365	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0354	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0488	95% KM Chebyshev UCL	0.0623
97.5% KM Chebyshev UCL	0.0809	99% KM Chebyshev UCL	0.118

Gamma GOF Tests on Detected Observations Only

Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	3.354	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0057	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	13.41	nu star (bias corrected)	N/A
Mean (detects)	0.0191		

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0191	SD (KM)	0.0099
Variance (KM)	9.8010E-5	SE of Mean (KM)	0.0099
k hat (KM)	3.722	k star (KM)	3.066
nu hat (KM)	119.1	nu star (KM)	98.11
theta hat (KM)	0.00513	theta star (KM)	0.00623
80% gamma percentile (KM)	0.0272	90% gamma percentile (KM)	0.0337
95% gamma percentile (KM)	0.0398	99% gamma percentile (KM)	0.0531

Gamma Kaplan-Meier (KM) Statistics

		Adjusted Level of Significance (β)	0.0335
Approximate Chi Square Value (98.11, α)	76.26	Adjusted Chi Square Value (98.11, β)	74.07
95% KM Approximate Gamma UCL	0.0246	95% KM Adjusted Gamma UCL	0.0253

Lognormal GOF Test on Detected Observations Only

Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0224	Mean in Log Scale	-4.115
SD in Original Scale	0.019	SD in Log Scale	0.839
95% t UCL (assumes normality of ROS data)	0.0307	95% Percentile Bootstrap UCL	0.0303
95% BCA Bootstrap UCL	0.0317	95% Bootstrap t UCL	0.0343
95% H-UCL (Log ROS)	0.0397		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.115	KM Geo Mean	0.0163
KM SD (logged)	0.574	95% Critical H Value (KM-Log)	2.13
KM Standard Error of Mean (logged)	0.574	95% H-UCL (KM -Log)	0.0264
KM SD (logged)	0.574	95% Critical H Value (KM-Log)	2.13
KM Standard Error of Mean (logged)	0.574		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0194	Mean in Log Scale	-3.963
SD in Original Scale	0.00364	SD in Log Scale	0.219
95% t UCL (Assumes normality)	0.021	95% H-Stat UCL	0.0216

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Suggested UCL to Use

95% KM (t) UCL 0.0365

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

2,4-Dichlorophenol

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 2,4-Dichlorophenol was not processed!

2,4-Dimethylphenol

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 2,4-Dimethylphenol was not processed!

2,4-Dinitrophenol

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 2,4-Dinitrophenol was not processed!

2,4-Dinitrotoluene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 2,4-Dinitrotoluene was not processed!

2,6-Dinitrotoluene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 2,6-Dinitrotoluene was not processed!

2-Chloronaphthalene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 2-Chloronaphthalene was not processed!

2-Chlorophenol

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 2-Chlorophenol was not processed!

2-Nitrophenol

General Statistics

Total Number of Observations	16	Number of Distinct Observations	5
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	4

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 2-Nitrophenol was not processed!

3,3'-Dichlorobenzidine

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 3,3'-Dichlorobenzidine was not processed!

4,4'-DDD

General Statistics

Total Number of Observations	16	Number of Distinct Observations	3
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	3

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 4,4'-DDD was not processed!

4,4'-DDE

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 4,4'-DDE was not processed!

4,4'-DDT

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!

Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 4,4'-DDT was not processed!

4,6-Dinitro-2-methylphenol

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 4,6-Dinitro-2-methylphenol was not processed!

4-Bromophenyl Phenyl Ether

General Statistics

Total Number of Observations	16	Number of Distinct Observations	5
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 4-Bromophenyl Phenyl Ether was not processed!

4-Chloro-3-methylphenol

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 4-Chloro-3-methylphenol was not processed!

4-Chlorophenyl Phenyl Ether

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable 4-Chlorophenyl Phenyl Ether was not processed!

4-Nitrophenol

General Statistics

Total Number of Observations	16	Number of Distinct Observations	7
Number of Detects	3	Number of Non-Detects	13
Number of Distinct Detects	3	Number of Distinct Non-Detects	4
Minimum Detect	0.045	Minimum Non-Detect	0.037
Maximum Detect	0.2	Maximum Non-Detect	0.04
Variance Detects	0.00606	Percent Non-Detects	81.25%
Mean Detects	0.118	SD Detects	0.0778
Median Detects	0.11	CV Detects	0.658
Skewness Detects	0.476	Kurtosis Detects	N/A
Mean of Logged Detects	-2.306	SD of Logged Detects	0.751

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.991	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.209	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0523	KM Standard Error of Mean	0.0129
90KM SD	0.042	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0748	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0734	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0908	95% KM Chebyshev UCL	0.108
97.5% KM Chebyshev UCL	0.133	99% KM Chebyshev UCL	0.18

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.248	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.636	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.229	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.434	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	3.069	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0386	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	18.41	nu star (bias corrected)	N/A
Mean (detects)	0.118		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0303
Maximum	0.2	Median	0.01
SD	0.0521	CV	1.719
k hat (MLE)	0.867	k star (bias corrected MLE)	0.746
Theta hat (MLE)	0.035	Theta star (bias corrected MLE)	0.0406

nu hat (MLE)	27.73	nu star (bias corrected)	23.86
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (23.86, α)	13.74	Adjusted Chi Square Value (23.86, β)	12.88
95% Gamma Approximate UCL	0.0526	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0523	SD (KM)	0.042
Variance (KM)	0.00177	SE of Mean (KM)	0.0129
k hat (KM)	1.547	k star (KM)	1.298
nu hat (KM)	49.5	nu star (KM)	41.55
theta hat (KM)	0.0338	theta star (KM)	0.0402
80% gamma percentile (KM)	0.0821	90% gamma percentile (KM)	0.113
95% gamma percentile (KM)	0.143	99% gamma percentile (KM)	0.212

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (41.55, α)	27.77	Adjusted Chi Square Value (41.55, β)	26.5
95% KM Approximate Gamma UCL	0.0782	95% KM Adjusted Gamma UCL	0.0819

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.987	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.219	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0251	Mean in Log Scale	-5.521
SD in Original Scale	0.0544	SD in Log Scale	1.981
95% t UCL (assumes normality of ROS data)	0.0489	95% Percentile Bootstrap UCL	0.0482
95% BCA Bootstrap UCL	0.0592	95% Bootstrap t UCL	0.122
95% H-UCL (Log ROS)	0.275		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.111	KM Geo Mean	0.0446
KM SD (logged)	0.469	95% Critical H Value (KM-Log)	2.019
KM Standard Error of Mean (logged)	0.144	95% H-UCL (KM -Log)	0.0635
KM SD (logged)	0.469	95% Critical H Value (KM-Log)	2.019
KM Standard Error of Mean (logged)	0.144		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0379	Mean in Log Scale	-3.636
SD in Original Scale	0.049	SD in Log Scale	0.715
95% t UCL (Assumes normality)	0.0594	95% H-Stat UCL	0.052

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0748

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Acenaphthene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	5
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Acenaphthene was not processed!

Acenaphthylene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	5
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Acenaphthylene was not processed!

Aldrin

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Aldrin was not processed!

alpha-Chlordane

General Statistics

Total Number of Observations	16	Number of Distinct Observations	6
Number of Detects	5	Number of Non-Detects	11
Number of Distinct Detects	5	Number of Distinct Non-Detects	1
Minimum Detect	0.0077	Minimum Non-Detect	0.001
Maximum Detect	0.015	Maximum Non-Detect	0.001
Variance Detects	8.1280E-6	Percent Non-Detects	68.75%
Mean Detects	0.0101	SD Detects	0.00285
Median Detects	0.0092	CV Detects	0.283
Skewness Detects	1.882	Kurtosis Detects	3.914
Mean of Logged Detects	-4.627	SD of Logged Detects	0.253

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.783	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.364	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00383	KM Standard Error of Mean	0.00124
90KM SD	0.00443	95% KM (BCA) UCL	0.00563
95% KM (t) UCL	0.006	95% KM (Percentile Bootstrap) UCL	0.00571
95% KM (z) UCL	0.00587	95% KM Bootstrap t UCL	0.00498
90% KM Chebyshev UCL	0.00755	95% KM Chebyshev UCL	0.00923
97.5% KM Chebyshev UCL	0.0116	99% KM Chebyshev UCL	0.0162

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.579	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.679	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.348	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.357	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	18.3	k star (bias corrected MLE)	7.454
Theta hat (MLE)	5.4969E-4	Theta star (bias corrected MLE)	0.00135
nu hat (MLE)	183	nu star (bias corrected)	74.54
Mean (detects)	0.0101		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0077	Mean	0.01
Maximum	0.015	Median	0.01
SD	0.00147	CV	0.147
k hat (MLE)	58.18	k star (bias corrected MLE)	47.31
Theta hat (MLE)	1.7222E-4	Theta star (bias corrected MLE)	2.1177E-4
nu hat (MLE)	1862	nu star (bias corrected)	1514
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (N/A, α)	1425	Adjusted Chi Square Value (N/A, β)	1415
95% Gamma Approximate UCL	0.0106	95% Gamma Adjusted UCL	0.0107

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00383	SD (KM)	0.00443
Variance (KM)	1.9667E-5	SE of Mean (KM)	0.00124
k hat (KM)	0.746	k star (KM)	0.648
nu hat (KM)	23.88	nu star (KM)	20.74
theta hat (KM)	0.00513	theta star (KM)	0.00591
80% gamma percentile (KM)	0.00631	90% gamma percentile (KM)	0.00979
95% gamma percentile (KM)	0.0134	99% gamma percentile (KM)	0.0221

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (20.74, α)	11.4	Adjusted Chi Square Value (20.74, β)	10.61
95% KM Approximate Gamma UCL	0.00697	95% KM Adjusted Gamma UCL	0.00749

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.844	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.33	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.319	Detected Data Not Lognormal at 10% Significance Level

Detected Data appear Approximate Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0059	Mean in Log Scale	-5.28
SD in Original Scale	0.00344	SD in Log Scale	0.561
95% t UCL (assumes normality of ROS data)	0.00741	95% Percentile Bootstrap UCL	0.00728
95% BCA Bootstrap UCL	0.00747	95% Bootstrap t UCL	0.00788
95% H-UCL (Log ROS)	0.00809		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.195	KM Geo Mean	0.00204
KM SD (logged)	1.065	95% Critical H Value (KM-Log)	2.805
KM Standard Error of Mean (logged)	0.298	95% H-UCL (KM -Log)	0.00777
KM SD (logged)	1.065	95% Critical H Value (KM-Log)	2.805
KM Standard Error of Mean (logged)	0.298		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.00349	Mean in Log Scale	-6.671
SD in Original Scale	0.00481	SD in Log Scale	1.43
95% t UCL (Assumes normality)	0.00559	95% H-Stat UCL	0.0124

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.006

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Anthracene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	5
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Anthracene was not processed!

Antimony

General Statistics

Total Number of Observations	16	Number of Distinct Observations	11
Number of Detects	9	Number of Non-Detects	7
Number of Distinct Detects	8	Number of Distinct Non-Detects	4
Minimum Detect	0.003	Minimum Non-Detect	0.0099
Maximum Detect	0.014	Maximum Non-Detect	0.014
Variance Detects	1.7481E-5	Percent Non-Detects	43.75%
Mean Detects	0.00679	SD Detects	0.00418
Median Detects	0.0051	CV Detects	0.616
Skewness Detects	1.334	Kurtosis Detects	0.227

Mean of Logged Detects	-5.134	SD of Logged Detects	0.54

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.759	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.764	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.297	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.316	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00611	KM Standard Error of Mean	0.00103
90KM SD	0.00342	95% KM (BCA) UCL	0.00788
95% KM (t) UCL	0.00791	95% KM (Percentile Bootstrap) UCL	0.00781
95% KM (z) UCL	0.0078	95% KM Bootstrap t UCL	0.00971
90% KM Chebyshev UCL	0.0092	95% KM Chebyshev UCL	0.0106
97.5% KM Chebyshev UCL	0.0125	99% KM Chebyshev UCL	0.0164

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.727	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.726	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.264	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.281	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	3.695	k star (bias corrected MLE)	2.537
Theta hat (MLE)	0.00184	Theta star (bias corrected MLE)	0.00268
nu hat (MLE)	66.51	nu star (bias corrected)	45.67
Mean (detects)	0.00679		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.003	Mean	0.00819
Maximum	0.014	Median	0.01
SD	0.00347	CV	0.423
k hat (MLE)	5.254	k star (bias corrected MLE)	4.311
Theta hat (MLE)	0.00156	Theta star (bias corrected MLE)	0.0019
nu hat (MLE)	168.1	nu star (bias corrected)	137.9
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (137.94, α)	111.8	Adjusted Chi Square Value (137.94, β)	109.1
95% Gamma Approximate UCL	0.0101	95% Gamma Adjusted UCL	0.0104

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00611	SD (KM)	0.00342
Variance (KM)	1.1683E-5	SE of Mean (KM)	0.00103
k hat (KM)	3.191	k star (KM)	2.634
nu hat (KM)	102.1	nu star (KM)	84.29
theta hat (KM)	0.00191	theta star (KM)	0.00232
80% gamma percentile (KM)	0.00885	90% gamma percentile (KM)	0.0111
95% gamma percentile (KM)	0.0133	99% gamma percentile (KM)	0.018

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (84.29, α)	64.13	Adjusted Chi Square Value (84.29, β)	62.13
95% KM Approximate Gamma UCL	0.00802	95% KM Adjusted Gamma UCL	0.00828

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.879	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.231	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.252	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00608	Mean in Log Scale	-5.204
SD in Original Scale	0.00328	SD in Log Scale	0.432
95% t UCL (assumes normality of ROS data)	0.00751	95% Percentile Bootstrap UCL	0.00746
95% BCA Bootstrap UCL	0.00777	95% Bootstrap t UCL	0.00937
95% H-UCL (Log ROS)	0.00753		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-5.216	KM Geo Mean	0.00543
KM SD (logged)	0.454	95% Critical H Value (KM-Log)	2.004
KM Standard Error of Mean (logged)	0.143	95% H-UCL (KM -Log)	0.00761
KM SD (logged)	0.454	95% Critical H Value (KM-Log)	2.004
KM Standard Error of Mean (logged)	0.143		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0066	Mean in Log Scale	-5.105
SD in Original Scale	0.00311	SD in Log Scale	0.406
95% t UCL (Assumes normality)	0.00796	95% H-Stat UCL	0.00809

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00791

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Aroclor 1016

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Aroclor 1016 was not processed!

Aroclor 1221

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Aroclor 1221 was not processed!

Aroclor 1232

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Aroclor 1232 was not processed!

Aroclor 1242

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Aroclor 1242 was not processed!

Aroclor 1248

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Aroclor 1248 was not processed!

Aroclor 1254

General Statistics

Total Number of Observations	16	Number of Distinct Observations	8
Number of Detects	5	Number of Non-Detects	11
Number of Distinct Detects	5	Number of Distinct Non-Detects	3
Minimum Detect	0.0034	Minimum Non-Detect	0.0019

Maximum Detect	0.0049	Maximum Non-Detect	0.0043
Variance Detects	3.8300E-7	Percent Non-Detects	68.75%
Mean Detects	0.00414	SD Detects	6.1887E-4
Median Detects	0.0041	CV Detects	0.149
Skewness Detects	0.0806	Kurtosis Detects	-1.901
Mean of Logged Detects	-5.496	SD of Logged Detects	0.15

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.171	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00263	KM Standard Error of Mean	3.0963E-4
90KM SD	0.00109	95% KM (BCA) UCL	0.00307
95% KM (t) UCL	0.00317	95% KM (Percentile Bootstrap) UCL	0.00312
95% KM (z) UCL	0.00314	95% KM Bootstrap t UCL	0.00288
90% KM Chebyshev UCL	0.00356	95% KM Chebyshev UCL	0.00398
97.5% KM Chebyshev UCL	0.00456	99% KM Chebyshev UCL	0.00571

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.228	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.678	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.201	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.357	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	55.61	k star (bias corrected MLE)	22.38
Theta hat (MLE)	7.4450E-5	Theta star (bias corrected MLE)	1.8501E-4
nu hat (MLE)	556.1	nu star (bias corrected)	223.8
Mean (detects)	0.00414		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0034	Mean	0.00817
Maximum	0.01	Median	0.01
SD	0.00282	CV	0.346
k hat (MLE)	6.729	k star (bias corrected MLE)	5.509
Theta hat (MLE)	0.00121	Theta star (bias corrected MLE)	0.00148
nu hat (MLE)	215.3	nu star (bias corrected)	176.3
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (176.29, α)	146.6	Adjusted Chi Square Value (176.29, β)	143.5
95% Gamma Approximate UCL	0.00982	95% Gamma Adjusted UCL	0.01

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00263	SD (KM)	0.00109
Variance (KM)	1.1857E-6	SE of Mean (KM)	3.0963E-4
k hat (KM)	5.818	k star (KM)	4.769
nu hat (KM)	186.2	nu star (KM)	152.6
theta hat (KM)	4.5145E-4	theta star (KM)	5.5077E-4
80% gamma percentile (KM)	0.00355	90% gamma percentile (KM)	0.00424

95% gamma percentile (KM)	0.00487	99% gamma percentile (KM)	0.0062

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (152.60, α)	125	Adjusted Chi Square Value (152.60, β)	122.2
95% KM Approximate Gamma UCL	0.00321	95% KM Adjusted Gamma UCL	0.00328

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.176	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00306	Mean in Log Scale	-5.824
SD in Original Scale	8.7220E-4	SD in Log Scale	0.271
95% t UCL (assumes normality of ROS data)	0.00345	95% Percentile Bootstrap UCL	0.00342
95% BCA Bootstrap UCL	0.00344	95% Bootstrap t UCL	0.0035
95% H-UCL (Log ROS)	0.00349		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.016	KM Geo Mean	0.00244
KM SD (logged)	0.367	95% Critical H Value (KM-Log)	1.925
KM Standard Error of Mean (logged)	0.105	95% H-UCL (KM -Log)	0.00313
KM SD (logged)	0.367	95% Critical H Value (KM-Log)	1.925
KM Standard Error of Mean (logged)	0.105		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00203	Mean in Log Scale	-6.438
SD in Original Scale	0.00153	SD in Log Scale	0.689
95% t UCL (Assumes normality)	0.0027	95% H-Stat UCL	0.00304

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.00317

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Aroclor 1260

General Statistics

Total Number of Observations	16	Number of Distinct Observations	7
Number of Detects	3	Number of Non-Detects	13
Number of Distinct Detects	3	Number of Distinct Non-Detects	4
Minimum Detect	0.0029	Minimum Non-Detect	0.0019
Maximum Detect	0.0058	Maximum Non-Detect	0.0028
Variance Detects	2.1233E-6	Percent Non-Detects	81.25%
Mean Detects	0.00427	SD Detects	0.00146
Median Detects	0.0041	CV Detects	0.342
Skewness Detects	0.508	Kurtosis Detects	N/A
Mean of Logged Detects	-5.497	SD of Logged Detects	0.347

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.99	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.212	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00234	KM Standard Error of Mean	3.2385E-4
90KM SD	0.00106	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.00291	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.00288	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.00332	95% KM Chebyshev UCL	0.00376
97.5% KM Chebyshev UCL	0.00437	99% KM Chebyshev UCL	0.00557

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.247	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.635	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.227	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.432	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	12.78	k star (bias corrected MLE)	N/A
Theta hat (MLE)	3.3397E-4	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	76.65	nu star (bias corrected)	N/A
Mean (detects)	0.00427		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0029	Mean	0.00893
Maximum	0.01	Median	0.01
SD	0.00237	CV	0.266
k hat (MLE)	9.525	k star (bias corrected MLE)	7.781
Theta hat (MLE)	9.3697E-4	Theta star (bias corrected MLE)	0.00115
nu hat (MLE)	304.8	nu star (bias corrected)	249
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (248.99, α)	213.5	Adjusted Chi Square Value (248.99, β)	209.7
95% Gamma Approximate UCL	0.0104	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00234	SD (KM)	0.00106
Variance (KM)	1.1187E-6	SE of Mean (KM)	3.2385E-4
k hat (KM)	4.91	k star (KM)	4.031
nu hat (KM)	157.1	nu star (KM)	129
theta hat (KM)	4.7732E-4	theta star (KM)	5.8139E-4
80% gamma percentile (KM)	0.00323	90% gamma percentile (KM)	0.00391
95% gamma percentile (KM)	0.00453	99% gamma percentile (KM)	0.00587

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (129.00, α)	103.8	Adjusted Chi Square Value (129.00, β)	101.2
95% KM Approximate Gamma UCL	0.00291	95% KM Adjusted Gamma UCL	0.00299

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	1	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.175	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0014	Mean in Log Scale	-7.009
SD in Original Scale	0.00156	SD in Log Scale	0.928
95% t UCL (assumes normality of ROS data)	0.00209	95% Percentile Bootstrap UCL	0.00205
95% BCA Bootstrap UCL	0.00225	95% Bootstrap t UCL	0.00274
95% H-UCL (Log ROS)	0.00259		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.122	KM Geo Mean	0.00219
KM SD (logged)	0.324	95% Critical H Value (KM-Log)	1.89
KM Standard Error of Mean (logged)	0.0993	95% H-UCL (KM -Log)	0.00271
KM SD (logged)	0.324	95% Critical H Value (KM-Log)	1.89
KM Standard Error of Mean (logged)	0.0993		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00167	Mean in Log Scale	-6.602
SD in Original Scale	0.00141	SD in Log Scale	0.58
95% t UCL (Assumes normality)	0.00228	95% H-Stat UCL	0.00221

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00291

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Arsenic

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.93	Mean	3.236
Maximum	9.25	Median	1.345
SD	2.991	Std. Error of Mean	0.748
Coefficient of Variation	0.924	Skewness	1.122

Normal GOF Test

Shapiro Wilk Test Statistic	0.746	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.354	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL	**95% UCLs (Adjusted for Skewness)**

95% Student's-t UCL	4.546	95% Adjusted-CLT UCL (Chen-1995)	4.689
		95% Modified-t UCL (Johnson-1978)	4.581

Gamma GOF Test

A-D Test Statistic	1.651	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.755	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.351	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.219	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.49	k star (bias corrected MLE)	1.252
Theta hat (MLE)	2.172	Theta star (bias corrected MLE)	2.584
nu hat (MLE)	47.67	nu star (bias corrected)	40.06
MLE Mean (bias corrected)	3.236	MLE Sd (bias corrected)	2.892
		Approximate Chi Square Value (0.05)	26.56
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	25.31

Assuming Gamma Distribution

95% Approximate Gamma UCL	4.88	95% Adjusted Gamma UCL	5.121

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.798	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.328	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.0726	Mean of logged Data	0.802
Maximum of Logged Data	2.225	SD of logged Data	0.861

Assuming Lognormal Distribution

95% H-UCL	5.634	90% Chebyshev (MVUE) UCL	5.325
95% Chebyshev (MVUE) UCL	6.316	97.5% Chebyshev (MVUE) UCL	7.691
99% Chebyshev (MVUE) UCL	10.39		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	4.465	95% BCA Bootstrap UCL	4.593
95% Standard Bootstrap UCL	4.406	95% Bootstrap-t UCL	4.768
95% Hall's Bootstrap UCL	4.322	95% Percentile Bootstrap UCL	4.471
90% Chebyshev(Mean, Sd) UCL	5.479	95% Chebyshev(Mean, Sd) UCL	6.495
97.5% Chebyshev(Mean, Sd) UCL	7.905	99% Chebyshev(Mean, Sd) UCL	10.67

Suggested UCL to Use

95% Student's-t UCL	4.546

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Azinphos-methyl

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Azinphos-methyl was not processed!

Benz(a)anthracene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	5
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Benz(a)anthracene was not processed!

Benzo(a)pyrene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	6
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	6

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Benzo(a)pyrene was not processed!

Benzo(b)fluoranthene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	6
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	6

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Benzo(b)fluoranthene was not processed!

Benzo(g,h,i)perylene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	6
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	6

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Benzo(g,h,i)perylene was not processed!

Benzo(k)fluoranthene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	6
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	6

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Benzo(k)fluoranthene was not processed!

Beryllium

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
Number of Detects	6	Number of Non-Detects	10
Number of Distinct Detects	6	Number of Distinct Non-Detects	9
Minimum Detect	9.0000E-4	Minimum Non-Detect	0.0037
Maximum Detect	0.0062	Maximum Non-Detect	0.0063
Variance Detects	3.4830E-6	Percent Non-Detects	62.5%
Mean Detects	0.00255	SD Detects	0.00187
Median Detects	0.00205	CV Detects	0.732
Skewness Detects	1.988	Kurtosis Detects	4.468
Mean of Logged Detects	-6.15	SD of Logged Detects	0.63

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.764	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.713	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.365	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.373	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level
Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.00211	KM Standard Error of Mean	3.9396E-4
90KM SD	0.00121	95% KM (BCA) UCL	0.00282
95% KM (t) UCL	0.0028	95% KM (Percentile Bootstrap) UCL	0.00276
95% KM (z) UCL	0.00276	95% KM Bootstrap t UCL	0.00305
90% KM Chebyshev UCL	0.00329	95% KM Chebyshev UCL	0.00383
97.5% KM Chebyshev UCL	0.00457	99% KM Chebyshev UCL	0.00603

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.463	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.701	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.296	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.335	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level
Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	2.958	k star (bias corrected MLE)	1.59
Theta hat (MLE)	8.6196E-4	Theta star (bias corrected MLE)	0.0016
nu hat (MLE)	35.5	nu star (bias corrected)	19.08
Mean (detects)	0.00255		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	9.0000E-4	Mean	0.00721
Maximum	0.01	Median	0.01
SD	0.00388	CV	0.538
k hat (MLE)	2.138	k star (bias corrected MLE)	1.779
Theta hat (MLE)	0.00337	Theta star (bias corrected MLE)	0.00405
nu hat (MLE)	68.42	nu star (bias corrected)	56.93
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (56.93, α)	40.58	Adjusted Chi Square Value (56.93, β)	39.01
95% Gamma Approximate UCL	0.0101	95% Gamma Adjusted UCL	0.0105

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.00211	SD (KM)	0.00121
Variance (KM)	1.4603E-6	SE of Mean (KM)	3.9396E-4
k hat (KM)	3.055	k star (KM)	2.524
nu hat (KM)	97.75	nu star (KM)	80.75
theta hat (KM)	6.9141E-4	theta star (KM)	8.3691E-4
80% gamma percentile (KM)	0.00308	90% gamma percentile (KM)	0.00389
95% gamma percentile (KM)	0.00466	99% gamma percentile (KM)	0.00635

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (80.75, α)	61.05	Adjusted Chi Square Value (80.75, β)	59.1
95% KM Approximate Gamma UCL	0.00279	95% KM Adjusted Gamma UCL	0.00289

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.932	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.826	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.259	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.298	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00208	Mean in Log Scale	-6.263
SD in Original Scale	0.00115	SD in Log Scale	0.385
95% t UCL (assumes normality of ROS data)	0.00258	95% Percentile Bootstrap UCL	0.00261
95% BCA Bootstrap UCL	0.00286	95% Bootstrap t UCL	0.00341
95% H-UCL (Log ROS)	0.00249		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.278	KM Geo Mean	0.00188
KM SD (logged)	0.466	95% Critical H Value (KM-Log)	2.016
KM Standard Error of Mean (logged)	0.184	95% H-UCL (KM -Log)	0.00267
KM SD (logged)	0.466	95% Critical H Value (KM-Log)	2.016
KM Standard Error of Mean (logged)	0.184		

DL/2 Statistics

DL/2 Normal **DL/2 Log-Transformed**

Mean in Original Scale	0.00244	Mean in Log Scale	-6.092
SD in Original Scale	0.00114	SD in Log Scale	0.396
95% t UCL (Assumes normality)	0.00294	95% H-Stat UCL	0.00299

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL 0.0028

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Bis(1-chloroisopropyl) Ether

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Bis(1-chloroisopropyl) Ether was not processed!

Bis(2-chloroethoxy)methane

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Bis(2-chloroethoxy)methane was not processed!

Bis(2-chloroethyl) Ether

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Bis(2-chloroethyl) Ether was not processed!

Bis(2-ethylhexyl) Phthalate

General Statistics

Total Number of Observations	16	Number of Distinct Observations	8
Number of Detects	5	Number of Non-Detects	11
Number of Distinct Detects	5	Number of Distinct Non-Detects	3
Minimum Detect	0.78	Minimum Non-Detect	1.9
Maximum Detect	0.91	Maximum Non-Detect	19
Variance Detects	0.00253	Percent Non-Detects	68.75%
Mean Detects	0.836	SD Detects	0.0503
Median Detects	0.84	CV Detects	0.0602
Skewness Detects	0.608	Kurtosis Detects	0.112
Mean of Logged Detects	-0.181	SD of Logged Detects	0.0596

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.958	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.686	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.19	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.396	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.836	KM Standard Error of Mean	0.0225
90KM SD	0.045	95% KM (BCA) UCL	0.875
95% KM (t) UCL	0.875	95% KM (Percentile Bootstrap) UCL	0.875
95% KM (z) UCL	0.873	95% KM Bootstrap t UCL	0.891
90% KM Chebyshev UCL	0.903	95% KM Chebyshev UCL	0.934
97.5% KM Chebyshev UCL	0.976	99% KM Chebyshev UCL	1.06

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.24	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.678	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.188	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.357	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Note GOF tests may be unreliable for small sample sizes

Gamma Statistics on Detected Data Only

k hat (MLE)	349.6	k star (bias corrected MLE)	140
Theta hat (MLE)	0.00239	Theta star (bias corrected MLE)	0.00597
nu hat (MLE)	3496	nu star (bias corrected)	1400
Mean (detects)	0.836		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.767	Mean	0.836
Maximum	0.91	Median	0.838
SD	0.0436	CV	0.0522
k hat (MLE)	392.8	k star (bias corrected MLE)	319.2
Theta hat (MLE)	0.00213	Theta star (bias corrected MLE)	0.00262
nu hat (MLE)	12569	nu star (bias corrected)	10213
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (N/A, α)	9980	Adjusted Chi Square Value (N/A, β)	9953
95% Gamma Approximate UCL	0.856	95% Gamma Adjusted UCL	0.858

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.836	SD (KM)	0.045

Variance (KM)	0.00202	SE of Mean (KM)	0.0225
k hat (KM)	345.3	k star (KM)	280.6
nu hat (KM)	11050	nu star (KM)	8979
theta hat (KM)	0.00242	theta star (KM)	0.00298
80% gamma percentile (KM)	0.878	90% gamma percentile (KM)	0.901
95% gamma percentile (KM)	0.92	99% gamma percentile (KM)	0.956

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (N/A, α)	8760	Adjusted Chi Square Value (N/A, β)	8735
95% KM Approximate Gamma UCL	0.857	95% KM Adjusted Gamma UCL	0.859

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.963	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.806	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.181	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.319	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.836	Mean in Log Scale	-0.181
SD in Original Scale	0.0434	SD in Log Scale	0.0518
95% t UCL (assumes normality of ROS data)	0.855	95% Percentile Bootstrap UCL	0.853
95% BCA Bootstrap UCL	0.854	95% Bootstrap t UCL	0.856
95% H-UCL (Log ROS)	N/A		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-0.181	KM Geo Mean	0.835
KM SD (logged)	0.0533	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0267	95% H-UCL (KM -Log)	N/A
KM SD (logged)	0.0533	95% Critical H Value (KM-Log)	N/A
KM Standard Error of Mean (logged)	0.0267		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.993	Mean in Log Scale	0.206
SD in Original Scale	2.931	SD in Log Scale	0.802
95% t UCL (Assumes normality)	3.277	95% H-Stat UCL	2.795

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.875

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Butyl Benzyl Phthalate

General Statistics

Total Number of Observations	16	Number of Distinct Observations	8
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	8

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Butyl Benzyl Phthalate was not processed!

Cadmium

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.0184	Mean	0.0844
Maximum	0.747	Median	0.038
SD	0.178	Std. Error of Mean	0.0444
Coefficient of Variation	2.104	Skewness	3.938

Normal GOF Test

Shapiro Wilk Test Statistic	0.357	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.475	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.162	95% Adjusted-CLT UCL (Chen-1995)	0.204
		95% Modified-t UCL (Johnson-1978)	0.169

Gamma GOF Test

A-D Test Statistic	2.523	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.768	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.374	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.222	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.903	k star (bias corrected MLE)	0.775
Theta hat (MLE)	0.0935	Theta star (bias corrected MLE)	0.109
nu hat (MLE)	28.89	nu star (bias corrected)	24.81
MLE Mean (bias corrected)	0.0844	MLE Sd (bias corrected)	0.0958
		Approximate Chi Square Value (0.05)	14.47
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	13.57

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.145	95% Adjusted Gamma UCL	0.154

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.757	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.249	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.995	Mean of logged Data	-3.12
Maximum of Logged Data	-0.292	SD of logged Data	0.874

Assuming Lognormal Distribution

95% H-UCL	0.114	90% Chebyshev (MVUE) UCL	0.107
95% Chebyshev (MVUE) UCL	0.127	97.5% Chebyshev (MVUE) UCL	0.155

99% Chebyshev (MVUE) UCL	0.21

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.157	95% BCA Bootstrap UCL	0.22
95% Standard Bootstrap UCL	0.157	95% Bootstrap-t UCL	0.675
95% Hall's Bootstrap UCL	0.504	95% Percentile Bootstrap UCL	0.172
90% Chebyshev(Mean, Sd) UCL	0.218	95% Chebyshev(Mean, Sd) UCL	0.278
97.5% Chebyshev(Mean, Sd) UCL	0.362	99% Chebyshev(Mean, Sd) UCL	0.526

Suggested UCL to Use

95% Student's-t UCL	0.162

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chlordane

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Chlordane was not processed!

Chromium

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.025	Mean	0.312
Maximum	0.884	Median	0.268
SD	0.251	Std. Error of Mean	0.0628
Coefficient of Variation	0.804	Skewness	1.435

Normal GOF Test

Shapiro Wilk Test Statistic	0.838	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.187	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level	

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.422	95% Adjusted-CLT UCL (Chen-1995)	0.44
		95% Modified-t UCL (Johnson-1978)	0.426

Gamma GOF Test

A-D Test Statistic	0.24	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.106	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.219	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.661	k star (bias corrected MLE)	1.391
Theta hat (MLE)	0.188	Theta star (bias corrected MLE)	0.225
nu hat (MLE)	53.14	nu star (bias corrected)	44.51
MLE Mean (bias corrected)	0.312	MLE Sd (bias corrected)	0.265
		Approximate Chi Square Value (0.05)	30.21
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	28.87

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.46	95% Adjusted Gamma UCL	0.482

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.947	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.138	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-3.689	Mean of logged Data	-1.494
Maximum of Logged Data	-0.123	SD of logged Data	0.924

Assuming Lognormal Distribution

95% H-UCL	0.638	90% Chebyshev (MVUE) UCL	0.582
95% Chebyshev (MVUE) UCL	0.695	97.5% Chebyshev (MVUE) UCL	0.853
99% Chebyshev (MVUE) UCL	1.162		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.416	95% BCA Bootstrap UCL	0.436
95% Standard Bootstrap UCL	0.412	95% Bootstrap-t UCL	0.482
95% Hall's Bootstrap UCL	0.682	95% Percentile Bootstrap UCL	0.418
90% Chebyshev(Mean, Sd) UCL	0.501	95% Chebyshev(Mean, Sd) UCL	0.586
97.5% Chebyshev(Mean, Sd) UCL	0.704	99% Chebyshev(Mean, Sd) UCL	0.937

Suggested UCL to Use

95% Student's-t UCL	0.422

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Chrysene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	5
		Number of Missing Observations	2

Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Chrysene was not processed!

Copper

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
		Number of Missing Observations	0
Minimum	0.899	Mean	2.474
Maximum	19.7	Median	1.195
SD	4.613	Std. Error of Mean	1.153
Coefficient of Variation	1.864	Skewness	3.944

Normal GOF Test

Shapiro Wilk Test Statistic	0.348	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.455	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	4.496	95% Adjusted-CLT UCL (Chen-1995)	5.586
		95% Modified-t UCL (Johnson-1978)	4.685

Gamma GOF Test

A-D Test Statistic	3.127	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.761	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.379	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.221	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.139	k star (bias corrected MLE)	0.967
Theta hat (MLE)	2.172	Theta star (bias corrected MLE)	2.558
nu hat (MLE)	36.44	nu star (bias corrected)	30.94
MLE Mean (bias corrected)	2.474	MLE Sd (bias corrected)	2.516
		Approximate Chi Square Value (0.05)	19.24
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	18.19

Assuming Gamma Distribution

95% Approximate Gamma UCL	3.98	95% Adjusted Gamma UCL	4.209

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.629	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.285	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-0.106	Mean of logged Data	0.406

Maximum of Logged Data	2.981	SD of logged Data	0.75

Assuming Lognormal Distribution

95% H-UCL	3.132	90% Chebyshev (MVUE) UCL	3.112
95% Chebyshev (MVUE) UCL	3.64	97.5% Chebyshev (MVUE) UCL	4.372
99% Chebyshev (MVUE) UCL	5.811		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	4.371	95% BCA Bootstrap UCL	5.979
95% Standard Bootstrap UCL	4.372	95% Bootstrap-t UCL	19.06
95% Hall's Bootstrap UCL	13.15	95% Percentile Bootstrap UCL	4.754
90% Chebyshev(Mean, Sd) UCL	5.934	95% Chebyshev(Mean, Sd) UCL	7.501
97.5% Chebyshev(Mean, Sd) UCL	9.676	99% Chebyshev(Mean, Sd) UCL	13.95

Suggested UCL to Use

95% Student's-t UCL	4.496

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Demeton-O,S

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Demeton-O,S was not processed!

Dibenz(a,h)anthracene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	6
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	6

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Dibenz(a,h)anthracene was not processed!

Dieldrin

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Dieldrin was not processed!

Diethyl Phthalate

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Diethyl Phthalate was not processed!

Dimethyl Phthalate

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Dimethyl Phthalate was not processed!

Di-n-butyl Phthalate

General Statistics

Total Number of Observations	16	Number of Distinct Observations	8
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	8

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Di-n-butyl Phthalate was not processed!

Di-n-octyl Phthalate

General Statistics

Total Number of Observations	16	Number of Distinct Observations	14
Number of Detects	3	Number of Non-Detects	13
Number of Distinct Detects	3	Number of Distinct Non-Detects	11

Minimum Detect	0.15	Minimum Non-Detect	0.093
Maximum Detect	0.24	Maximum Non-Detect	0.99
Variance Detects	0.00203	Percent Non-Detects	81.25%
Mean Detects	0.193	SD Detects	0.0451
Median Detects	0.19	CV Detects	0.233
Skewness Detects	0.331	Kurtosis Detects	N/A
Mean of Logged Detects	-1.662	SD of Logged Detects	0.235

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.996	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.196	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.126	KM Standard Error of Mean	0.0212
90KM SD	0.0519	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.164	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.161	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.19	95% KM Chebyshev UCL	0.219
97.5% KM Chebyshev UCL	0.259	99% KM Chebyshev UCL	0.337

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.246	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.635	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.225	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.431	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	27.46	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00704	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	164.8	nu star (bias corrected)	N/A
Mean (detects)	0.193		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0791
Maximum	0.24	Median	0.0731
SD	0.0683	CV	0.864
k hat (MLE)	1.534	k star (bias corrected MLE)	1.288
Theta hat (MLE)	0.0516	Theta star (bias corrected MLE)	0.0614
nu hat (MLE)	49.08	nu star (bias corrected)	41.21
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (41.21, α)	27.5	Adjusted Chi Square Value (41.21, β)	26.23
95% Gamma Approximate UCL	0.119	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.126	SD (KM)	0.0519
Variance (KM)	0.00269	SE of Mean (KM)	0.0212

k hat (KM)	5.946	k star (KM)	4.873
nu hat (KM)	190.3	nu star (KM)	155.9
theta hat (KM)	0.0213	theta star (KM)	0.0259
80% gamma percentile (KM)	0.17	90% gamma percentile (KM)	0.203
95% gamma percentile (KM)	0.233	99% gamma percentile (KM)	0.296

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (155.93, α)	128.1	Adjusted Chi Square Value (155.93, β)	125.2
95% KM Approximate Gamma UCL	0.154	95% KM Adjusted Gamma UCL	0.157

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	1	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.175	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.108	Mean in Log Scale	-2.306
SD in Original Scale	0.05	SD in Log Scale	0.391
95% t UCL (assumes normality of ROS data)	0.13	95% Percentile Bootstrap UCL	0.129
95% BCA Bootstrap UCL	0.135	95% Bootstrap t UCL	0.143
95% H-UCL (Log ROS)	0.131		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-2.137	KM Geo Mean	0.118
KM SD (logged)	0.354	95% Critical H Value (KM-Log)	1.914
KM Standard Error of Mean (logged)	0.145	95% H-UCL (KM -Log)	0.15
KM SD (logged)	0.354	95% Critical H Value (KM-Log)	1.914
KM Standard Error of Mean (logged)	0.145		

Note: KM UCLs may be biased low with this dataset. Other substitution method recommended

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.266	Mean in Log Scale	-1.764
SD in Original Scale	0.206	SD in Log Scale	1.071
95% t UCL (Assumes normality)	0.356	95% H-Stat UCL	0.663

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.164

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Endosulfan I

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Endosulfan I was not processed!

Endosulfan II

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Endosulfan II was not processed!

Endosulfan Sulfate

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Endosulfan Sulfate was not processed!

Endrin

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Endrin was not processed!

Endrin Aldehyde

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Endrin Aldehyde was not processed!

Endrin Ketone

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Endrin Ketone was not processed!

Ethyl parathion

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Ethyl parathion was not processed!

Fluoranthene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	5
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Fluoranthene was not processed!

Fluorene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	5
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Fluorene was not processed!

gamma-BHC (Lindane)

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable gamma-BHC (Lindane) was not processed!

Heptachlor

General Statistics

Total Number of Observations	16	Number of Distinct Observations	12
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	12

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Heptachlor was not processed!

Heptachlor Epoxide

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Heptachlor Epoxide was not processed!

Hexachlorobenzene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	5
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Hexachlorobenzene was not processed!

Hexachlorobutadiene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Hexachlorobutadiene was not processed!

Hexachlorocyclopentadiene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Hexachlorocyclopentadiene was not processed!

Hexachloroethane

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Hexachloroethane was not processed!

Indeno(1,2,3-cd)pyrene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	6
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	6

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Indeno(1,2,3-cd)pyrene was not processed!

Isophorone

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Isophorone was not processed!

Lead

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.0015	Mean	0.0229
Maximum	0.0812	Median	0.017
SD	0.0202	Std. Error of Mean	0.00506
Coefficient of Variation	0.883	Skewness	1.749

Normal GOF Test

Shapiro Wilk Test Statistic	0.839	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.209	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Approximate Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0318	95% Adjusted-CLT UCL (Chen-1995)	0.0336
		95% Modified-t UCL (Johnson-1978)	0.0321

Gamma GOF Test

A-D Test Statistic	0.156	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.0995	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.219	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.445	k star (bias corrected MLE)	1.215
Theta hat (MLE)	0.0159	Theta star (bias corrected MLE)	0.0188
nu hat (MLE)	46.23	nu star (bias corrected)	38.9
MLE Mean (bias corrected)	0.0229	MLE Sd (bias corrected)	0.0208
		Approximate Chi Square Value (0.05)	25.61
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	24.39

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0348	95% Adjusted Gamma UCL	0.0365

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.962	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.135	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-6.502	Mean of logged Data	-4.161
Maximum of Logged Data	-2.511	SD of logged Data	0.998

Assuming Lognormal Distribution

95% H-UCL	0.0515	90% Chebyshev (MVUE) UCL	0.0448
95% Chebyshev (MVUE) UCL	0.0539	97.5% Chebyshev (MVUE) UCL	0.0667

99% Chebyshev (MVUE) UCL	0.0916

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0312	95% BCA Bootstrap UCL	0.0334
95% Standard Bootstrap UCL	0.031	95% Bootstrap-t UCL	0.036
95% Hall's Bootstrap UCL	0.0414	95% Percentile Bootstrap UCL	0.0316
90% Chebyshev(Mean, Sd) UCL	0.0381	95% Chebyshev(Mean, Sd) UCL	0.0449
97.5% Chebyshev(Mean, Sd) UCL	0.0545	99% Chebyshev(Mean, Sd) UCL	0.0732

Suggested UCL to Use

95% Student's-t UCL	0.0318

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Malathion

General Statistics

Total Number of Observations	16	Number of Distinct Observations	4
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	4

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Malathion was not processed!

Mercury

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.0028	Mean	0.0244
Maximum	0.0465	Median	0.0261
SD	0.0167	Std. Error of Mean	0.00418
Coefficient of Variation	0.686	Skewness	-0.224

Normal GOF Test

Shapiro Wilk Test Statistic	0.863	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.202	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0317	95% Adjusted-CLT UCL (Chen-1995)	0.031
		95% Modified-t UCL (Johnson-1978)	0.0317

Gamma GOF Test

A-D Test Statistic	1.381	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.758	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.25	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.22	Data Not Gamma Distributed at 5% Significance Level	

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.314	k star (bias corrected MLE)	1.11
Theta hat (MLE)	0.0186	Theta star (bias corrected MLE)	0.022
nu hat (MLE)	42.06	nu star (bias corrected)	35.5
MLE Mean (bias corrected)	0.0244	MLE Sd (bias corrected)	0.0232
		Approximate Chi Square Value (0.05)	22.87
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	21.72

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0379	95% Adjusted Gamma UCL	0.0399

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.775	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.28	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-5.878	Mean of logged Data	-4.14
Maximum of Logged Data	-3.068	SD of logged Data	1.123

Assuming Lognormal Distribution

95% H-UCL	0.0693	90% Chebyshev (MVUE) UCL	0.0547
95% Chebyshev (MVUE) UCL	0.0667	97.5% Chebyshev (MVUE) UCL	0.0834
99% Chebyshev (MVUE) UCL	0.116		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0313	95% BCA Bootstrap UCL	0.0308
95% Standard Bootstrap UCL	0.031	95% Bootstrap-t UCL	0.0314
95% Hall's Bootstrap UCL	0.0306	95% Percentile Bootstrap UCL	0.0309
90% Chebyshev(Mean, Sd) UCL	0.0369	95% Chebyshev(Mean, Sd) UCL	0.0426
97.5% Chebyshev(Mean, Sd) UCL	0.0505	99% Chebyshev(Mean, Sd) UCL	0.066

Suggested UCL to Use

95% Student's-t UCL	0.0317

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Methoxychlor

General Statistics

Total Number of Observations	16	Number of Distinct Observations	5
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Methoxychlor was not processed!

Methyl Mercury

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.0019	Mean	0.021
Maximum	0.0437	Median	0.0214
SD	0.0154	Std. Error of Mean	0.00386
Coefficient of Variation	0.735	Skewness	0.14

Normal GOF Test

Shapiro Wilk Test Statistic	0.887	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.174	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0278	95% Adjusted-CLT UCL (Chen-1995)	0.0275
		95% Modified-t UCL (Johnson-1978)	0.0278

Gamma GOF Test

A-D Test Statistic	0.835	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.759	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.184	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.22	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.258	k star (bias corrected MLE)	1.064
Theta hat (MLE)	0.0167	Theta star (bias corrected MLE)	0.0198
nu hat (MLE)	40.25	nu star (bias corrected)	34.03
MLE Mean (bias corrected)	0.021	MLE Sd (bias corrected)	0.0204
		Approximate Chi Square Value (0.05)	21.69
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	20.57

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.033	95% Adjusted Gamma UCL	0.0348

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.841	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.217	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-6.266	Mean of logged Data	-4.31
Maximum of Logged Data	-3.13	SD of logged Data	1.146

Assuming Lognormal Distribution

95% H-UCL	0.0618	90% Chebyshev (MVUE) UCL	0.0478
95% Chebyshev (MVUE) UCL	0.0584	97.5% Chebyshev (MVUE) UCL	0.0731
99% Chebyshev (MVUE) UCL	0.102		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0274	95% BCA Bootstrap UCL	0.0278
95% Standard Bootstrap UCL	0.0271	95% Bootstrap-t UCL	0.0281
95% Hall's Bootstrap UCL	0.0273	95% Percentile Bootstrap UCL	0.0272
90% Chebyshev(Mean, Sd) UCL	0.0326	95% Chebyshev(Mean, Sd) UCL	0.0379
97.5% Chebyshev(Mean, Sd) UCL	0.0451	99% Chebyshev(Mean, Sd) UCL	0.0594

Suggested UCL to Use

95% Student's-t UCL	0.0278

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Mirex

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Mirex was not processed!

Molybdenum

General Statistics

Total Number of Observations	16	Number of Distinct Observations	11
Number of Detects	12	Number of Non-Detects	4
Number of Distinct Detects	10	Number of Distinct Non-Detects	4
Minimum Detect	0.007	Minimum Non-Detect	0.02
Maximum Detect	0.052	Maximum Non-Detect	0.024
Variance Detects	1.2936E-4	Percent Non-Detects	25%
Mean Detects	0.0215	SD Detects	0.0114
Median Detects	0.0205	CV Detects	0.529
Skewness Detects	1.786	Kurtosis Detects	4.663
Mean of Logged Detects	-3.952	SD of Logged Detects	0.496

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.836	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.805	Detected Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.212	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.281	Detected Data appear Normal at 1% Significance Level	

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0196	KM Standard Error of Mean	0.00272
90KM SD	0.0102	95% KM (BCA) UCL	0.0242
95% KM (t) UCL	0.0244	95% KM (Percentile Bootstrap) UCL	0.0243
95% KM (z) UCL	0.0241	95% KM Bootstrap t UCL	0.0266

90% KM Chebyshev UCL	0.0278	95% KM Chebyshev UCL	0.0315
97.5% KM Chebyshev UCL	0.0366	99% KM Chebyshev UCL	0.0467

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.367	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.734	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.147	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.246	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	4.598	k star (bias corrected MLE)	3.504
Theta hat (MLE)	0.00468	Theta star (bias corrected MLE)	0.00614
nu hat (MLE)	110.4	nu star (bias corrected)	84.1
Mean (detects)	0.0215		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.007	Mean	0.0194
Maximum	0.052	Median	0.015
SD	0.0104	CV	0.537
k hat (MLE)	4.905	k star (bias corrected MLE)	4.027
Theta hat (MLE)	0.00396	Theta star (bias corrected MLE)	0.00482
nu hat (MLE)	157	nu star (bias corrected)	128.9
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (128.88, α)	103.7	Adjusted Chi Square Value (128.88, β)	101.1
95% Gamma Approximate UCL	0.0242	95% Gamma Adjusted UCL	0.0248

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0196	SD (KM)	0.0102
Variance (KM)	1.0334E-4	SE of Mean (KM)	0.00272
k hat (KM)	3.724	k star (KM)	3.067
nu hat (KM)	119.2	nu star (KM)	98.16
theta hat (KM)	0.00527	theta star (KM)	0.0064
80% gamma percentile (KM)	0.0279	90% gamma percentile (KM)	0.0346
95% gamma percentile (KM)	0.0409	99% gamma percentile (KM)	0.0545

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (98.16, α)	76.3	Adjusted Chi Square Value (98.16, β)	74.11
95% KM Approximate Gamma UCL	0.0252	95% KM Adjusted Gamma UCL	0.026

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.956	**Shapiro Wilk GOF Test**
10% Shapiro Wilk Critical Value	0.883	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.14	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.223	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0195	Mean in Log Scale	-4.041
SD in Original Scale	0.0104	SD in Log Scale	0.454
95% t UCL (assumes normality of ROS data)	0.024	95% Percentile Bootstrap UCL	0.024
95% BCA Bootstrap UCL	0.0254	95% Bootstrap t UCL	0.0266
95% H-UCL (Log ROS)	0.0246		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.044	KM Geo Mean	0.0175
KM SD (logged)	0.469	95% Critical H Value (KM-Log)	2.019
KM Standard Error of Mean (logged)	0.133	95% H-UCL (KM -Log)	0.025
KM SD (logged)	0.469	95% Critical H Value (KM-Log)	2.019
KM Standard Error of Mean (logged)	0.133		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0188	Mean in Log Scale	-4.095
SD in Original Scale	0.0108	SD in Log Scale	0.497
95% t UCL (Assumes normality)	0.0236	95% H-Stat UCL	0.0245

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0244

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Naphthalene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	5
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Naphthalene was not processed!

Nickel

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.018	Mean	0.209
Maximum	0.575	Median	0.208
SD	0.148	Std. Error of Mean	0.037
Coefficient of Variation	0.709	Skewness	1.043

Normal GOF Test

Shapiro Wilk Test Statistic	0.925	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.844	Data appear Normal at 1% Significance Level	
Lilliefors Test Statistic	0.177	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.248	Data appear Normal at 1% Significance Level	

Data appear Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.273	95% Adjusted-CLT UCL (Chen-1995)	0.28
		95% Modified-t UCL (Johnson-1978)	0.275

Gamma GOF Test

A-D Test Statistic	0.285	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.129	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.218	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.745	k star (bias corrected MLE)	1.46
Theta hat (MLE)	0.12	Theta star (bias corrected MLE)	0.143
nu hat (MLE)	55.84	nu star (bias corrected)	46.7
MLE Mean (bias corrected)	0.209	MLE Sd (bias corrected)	0.173
		Approximate Chi Square Value (0.05)	32.02
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	30.64

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.304	95% Adjusted Gamma UCL	0.318

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.914	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.906	Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.166	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.196	Data appear Lognormal at 10% Significance Level

Data appear Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-4.017	Mean of logged Data	-1.88
Maximum of Logged Data	-0.553	SD of logged Data	0.938

Assuming Lognormal Distribution

95% H-UCL	0.446	90% Chebyshev (MVUE) UCL	0.404
95% Chebyshev (MVUE) UCL	0.483	97.5% Chebyshev (MVUE) UCL	0.593
99% Chebyshev (MVUE) UCL	0.81		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.269	95% BCA Bootstrap UCL	0.277
95% Standard Bootstrap UCL	0.267	95% Bootstrap-t UCL	0.288
95% Hall's Bootstrap UCL	0.303	95% Percentile Bootstrap UCL	0.272
90% Chebyshev(Mean, Sd) UCL	0.32	95% Chebyshev(Mean, Sd) UCL	0.37
97.5% Chebyshev(Mean, Sd) UCL	0.44	99% Chebyshev(Mean, Sd) UCL	0.577

Suggested UCL to Use

95% Student's-t UCL	0.273

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Nitrobenzene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	7
Number of Detects	3	Number of Non-Detects	13
Number of Distinct Detects	3	Number of Distinct Non-Detects	4
Minimum Detect	0.0076	Minimum Non-Detect	0.037
Maximum Detect	0.034	Maximum Non-Detect	0.04

Variance Detects	2.0005E-4	Percent Non-Detects	81.25%
Mean Detects	0.0179	SD Detects	0.0141
Median Detects	0.012	CV Detects	0.792
Skewness Detects	1.545	Kurtosis Detects	N/A
Mean of Logged Detects	-4.228	SD of Logged Detects	0.768

Warning: Data set has only 3 Detected Values.

This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.871	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.753	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.328	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.429	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Note GOF tests may be unreliable for small sample sizes

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0179	KM Standard Error of Mean	0.00817
90KM SD	0.0115	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.0322	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0313	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.0424	95% KM Chebyshev UCL	0.0535
97.5% KM Chebyshev UCL	0.0689	99% KM Chebyshev UCL	0.0991

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.351	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.636	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.318	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.434	Detected data appear Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.616	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.00683	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	15.7	nu star (bias corrected)	N/A
Mean (detects)	0.0179		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0076	Mean	0.0194
Maximum	0.0431	Median	0.0148
SD	0.011	CV	0.566
k hat (MLE)	3.552	k star (bias corrected MLE)	2.927
Theta hat (MLE)	0.00545	Theta star (bias corrected MLE)	0.00662
nu hat (MLE)	113.7	nu star (bias corrected)	93.68
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (93.68, α)	72.36	Adjusted Chi Square Value (93.68, β)	70.23
95% Gamma Approximate UCL	0.0251	95% Gamma Adjusted UCL	N/A

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0179	SD (KM)	0.0115
Variance (KM)	1.3337E-4	SE of Mean (KM)	0.00817
k hat (KM)	2.393	k star (KM)	1.986
nu hat (KM)	76.59	nu star (KM)	63.56

theta hat (KM)	0.00746	theta star (KM)	0.00899
80% gamma percentile (KM)	0.0268	90% gamma percentile (KM)	0.0348
95% gamma percentile (KM)	0.0425	99% gamma percentile (KM)	0.0595

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (63.56, α)	46.22	Adjusted Chi Square Value (63.56, β)	44.54
95% KM Approximate Gamma UCL	0.0246	95% KM Adjusted Gamma UCL	0.0255

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.952	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.789	Detected Data appear Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.267	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.389	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Lognormal at 10% Significance Level

Note GOF tests may be unreliable for small sample sizes

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.018	Mean in Log Scale	-4.228
SD in Original Scale	0.0122	SD in Log Scale	0.678
95% t UCL (assumes normality of ROS data)	0.0233	95% Percentile Bootstrap UCL	0.023
95% BCA Bootstrap UCL	0.0236	95% Bootstrap t UCL	0.0247
95% H-UCL (Log ROS)	0.0272		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-4.228	KM Geo Mean	0.0146
KM SD (logged)	0.627	95% Critical H Value (KM-Log)	2.191
KM Standard Error of Mean (logged)	0.443	95% H-UCL (KM -Log)	0.0253
KM SD (logged)	0.627	95% Critical H Value (KM-Log)	2.191
KM Standard Error of Mean (logged)	0.443		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.019	Mean in Log Scale	-4
SD in Original Scale	0.00521	SD in Log Scale	0.303
95% t UCL (Assumes normality)	0.0213	95% H-Stat UCL	0.0222

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0322

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

N-Nitrosodimethylamine

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
Number of Detects	14	Number of Non-Detects	2
Number of Distinct Detects	12	Number of Distinct Non-Detects	1
Minimum Detect	0.017	Minimum Non-Detect	0.0081
Maximum Detect	0.32	Maximum Non-Detect	0.0081
Variance Detects	0.00653	Percent Non-Detects	12.5%
Mean Detects	0.071	SD Detects	0.0808
Median Detects	0.0435	CV Detects	1.138
Skewness Detects	2.546	Kurtosis Detects	7.38
Mean of Logged Detects	-3.066	SD of Logged Detects	0.905

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.682	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.825	Detected Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.252	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.263	Detected Data appear Normal at 1% Significance Level

Detected Data appear Approximate Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0631	KM Standard Error of Mean	0.0197
90KM SD	0.0757	95% KM (BCA) UCL	0.0947
95% KM (t) UCL	0.0976	95% KM (Percentile Bootstrap) UCL	0.0948
95% KM (z) UCL	0.0955	95% KM Bootstrap t UCL	0.136
90% KM Chebyshev UCL	0.122	95% KM Chebyshev UCL	0.149
97.5% KM Chebyshev UCL	0.186	99% KM Chebyshev UCL	0.259

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.648	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.754	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.182	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.234	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.33	k star (bias corrected MLE)	1.093
Theta hat (MLE)	0.0534	Theta star (bias corrected MLE)	0.065
nu hat (MLE)	37.24	nu star (bias corrected)	30.6
Mean (detects)	0.071		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.0634
Maximum	0.32	Median	0.0365
SD	0.0781	CV	1.232
k hat (MLE)	1.138	k star (bias corrected MLE)	0.967
Theta hat (MLE)	0.0557	Theta star (bias corrected MLE)	0.0656
nu hat (MLE)	36.43	nu star (bias corrected)	30.93
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (30.93, α)	19.23	Adjusted Chi Square Value (30.93, β)	18.18
95% Gamma Approximate UCL	0.102	95% Gamma Adjusted UCL	0.108

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0631	SD (KM)	0.0757
Variance (KM)	0.00574	SE of Mean (KM)	0.0197
k hat (KM)	0.695	k star (KM)	0.606
nu hat (KM)	22.23	nu star (KM)	19.4
theta hat (KM)	0.0909	theta star (KM)	0.104
80% gamma percentile (KM)	0.104	90% gamma percentile (KM)	0.164
95% gamma percentile (KM)	0.226	99% gamma percentile (KM)	0.377

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (19.40, α)	10.41	Adjusted Chi Square Value (19.40, β)	9.664
95% KM Approximate Gamma UCL	0.118	95% KM Adjusted Gamma UCL	0.127

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.911	**Shapiro Wilk GOF Test**

10% Shapiro Wilk Critical Value	0.895	Detected Data appear Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.196	**Lilliefors GOF Test**
10% Lilliefors Critical Value	0.208	Detected Data appear Lognormal at 10% Significance Level

Detected Data appear Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0628	Mean in Log Scale	-3.333
SD in Original Scale	0.0785	SD in Log Scale	1.117
95% t UCL (assumes normality of ROS data)	0.0972	95% Percentile Bootstrap UCL	0.0959
95% BCA Bootstrap UCL	0.11	95% Bootstrap t UCL	0.133
95% H-UCL (Log ROS)	0.153		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-3.285	KM Geo Mean	0.0375
KM SD (logged)	1	95% Critical H Value (KM-Log)	2.704
KM Standard Error of Mean (logged)	0.26	95% H-UCL (KM -Log)	0.124
KM SD (logged)	1	95% Critical H Value (KM-Log)	2.704
KM Standard Error of Mean (logged)	0.26		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.0626	Mean in Log Scale	-3.371
SD in Original Scale	0.0786	SD in Log Scale	1.186
95% t UCL (Assumes normality)	0.0971	95% H-Stat UCL	0.174

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.0976

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

N-Nitrosodi-n-propylamine

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable N-Nitrosodi-n-propylamine was not processed!

N-Nitrosodiphenylamine

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	1	Number of Non-Detects	15
Number of Distinct Detects	1	Number of Distinct Non-Detects	1

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable N-Nitrosodiphenylamine was not processed!

Pentachlorophenol

General Statistics

Total Number of Observations	16	Number of Distinct Observations	8
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	8

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Pentachlorophenol was not processed!

Phenanthrene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	5
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14
Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Phenanthrene was not processed!

Phenol

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Phenol was not processed!

Pyrene

General Statistics

Total Number of Observations	14	Number of Distinct Observations	5
		Number of Missing Observations	2
Number of Detects	0	Number of Non-Detects	14

Number of Distinct Detects	0	Number of Distinct Non-Detects	5

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Pyrene was not processed!

Selenium

General Statistics

Total Number of Observations	16	Number of Distinct Observations	11
		Number of Missing Observations	0
Minimum	0.16	Mean	0.614
Maximum	0.99	Median	0.815
SD	0.326	Std. Error of Mean	0.0814
Coefficient of Variation	0.53	Skewness	-0.52

Normal GOF Test

Shapiro Wilk Test Statistic	0.8	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.278	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.757	95% Adjusted-CLT UCL (Chen-1995)	0.737
		95% Modified-t UCL (Johnson-1978)	0.755

Gamma GOF Test

A-D Test Statistic	1.813	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.747	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.304	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.217	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.588	k star (bias corrected MLE)	2.145
Theta hat (MLE)	0.237	Theta star (bias corrected MLE)	0.286
nu hat (MLE)	82.82	nu star (bias corrected)	68.63
MLE Mean (bias corrected)	0.614	MLE Sd (bias corrected)	0.42
		Approximate Chi Square Value (0.05)	50.56
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	48.8

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.834	95% Adjusted Gamma UCL	0.864

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.745	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.301	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-1.833	Mean of logged Data	-0.693
Maximum of Logged Data	-0.0101	SD of logged Data	0.735

Assuming Lognormal Distribution

95% H-UCL	1.019	90% Chebyshev (MVUE) UCL	1.018
95% Chebyshev (MVUE) UCL	1.188	97.5% Chebyshev (MVUE) UCL	1.425
99% Chebyshev (MVUE) UCL	1.889		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.748	95% BCA Bootstrap UCL	0.734
95% Standard Bootstrap UCL	0.742	95% Bootstrap-t UCL	0.744
95% Hall's Bootstrap UCL	0.729	95% Percentile Bootstrap UCL	0.738
90% Chebyshev(Mean, Sd) UCL	0.859	95% Chebyshev(Mean, Sd) UCL	0.969
97.5% Chebyshev(Mean, Sd) UCL	1.123	99% Chebyshev(Mean, Sd) UCL	1.424

Suggested UCL to Use

95% Student's-t UCL	0.757

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Silver

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	0.0026	Mean	0.0394
Maximum	0.246	Median	0.0307
SD	0.0577	Std. Error of Mean	0.0144
Coefficient of Variation	1.464	Skewness	3.395

Normal GOF Test

Shapiro Wilk Test Statistic	0.548	**Shapiro Wilk GOF Test**	
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level	
Lilliefors Test Statistic	0.353	**Lilliefors GOF Test**	
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level	

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	0.0648	95% Adjusted-CLT UCL (Chen-1995)	0.0763
		95% Modified-t UCL (Johnson-1978)	0.0668

Gamma GOF Test

A-D Test Statistic	0.804	**Anderson-Darling Gamma GOF Test**	
5% A-D Critical Value	0.77	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.205	**Kolmogorov-Smirnov Gamma GOF Test**	
5% K-S Critical Value	0.222	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.855	k star (bias corrected MLE)	0.736
Theta hat (MLE)	0.0461	Theta star (bias corrected MLE)	0.0536
nu hat (MLE)	27.36	nu star (bias corrected)	23.57

MLE Mean (bias corrected)	0.0394	MLE Sd (bias corrected)	0.046
		Approximate Chi Square Value (0.05)	13.52
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	12.66

Assuming Gamma Distribution

95% Approximate Gamma UCL	0.0688	95% Adjusted Gamma UCL	0.0734

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.894	**Shapiro Wilk Lognormal GOF Test**	
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.241	**Lilliefors Lognormal GOF Test**	
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level	

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	-5.952	Mean of logged Data	-3.921
Maximum of Logged Data	-1.402	SD of logged Data	1.275

Assuming Lognormal Distribution

95% H-UCL	0.126	90% Chebyshev (MVUE) UCL	0.0858
95% Chebyshev (MVUE) UCL	0.106	97.5% Chebyshev (MVUE) UCL	0.134
99% Chebyshev (MVUE) UCL	0.189		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	0.0632	95% BCA Bootstrap UCL	0.0832
95% Standard Bootstrap UCL	0.0631	95% Bootstrap-t UCL	0.104
95% Hall's Bootstrap UCL	0.16	95% Percentile Bootstrap UCL	0.0673
90% Chebyshev(Mean, Sd) UCL	0.0828	95% Chebyshev(Mean, Sd) UCL	0.102
97.5% Chebyshev(Mean, Sd) UCL	0.13	99% Chebyshev(Mean, Sd) UCL	0.183

Suggested UCL to Use

95% Adjusted Gamma UCL	0.0734

The calculated UCLs are based on assumptions that the data were collected in a random and unbiased manner.
Please verify the data were collected from random locations.
If the data were collected using judgmental or other non-random methods,
then contact a statistician to correctly calculate UCLs.

When a data set follows an approximate distribution passing only one of the GOF tests,
it is suggested to use a UCL based upon a distribution passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Thallium

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
Number of Detects	13	Number of Non-Detects	3
Number of Distinct Detects	12	Number of Distinct Non-Detects	3
Minimum Detect	6.0000E-4	Minimum Non-Detect	0.0042
Maximum Detect	0.0037	Maximum Non-Detect	0.0048
Variance Detects	9.2667E-7	Percent Non-Detects	18.75%
Mean Detects	0.0026	SD Detects	9.6264E-4
Median Detects	0.0027	CV Detects	0.37
Skewness Detects	-0.747	Kurtosis Detects	-0.0975

Mean of Logged Detects	-6.048	SD of Logged Detects	0.517

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.933	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.814	Detected Data appear Normal at 1% Significance Level
Lilliefors Test Statistic	0.127	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.271	Detected Data appear Normal at 1% Significance Level

Detected Data appear Normal at 1% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

KM Mean	0.0026	KM Standard Error of Mean	2.6699E-4
90KM SD	9.2487E-4	95% KM (BCA) UCL	0.00301
95% KM (t) UCL	0.00307	95% KM (Percentile Bootstrap) UCL	0.00301
95% KM (z) UCL	0.00304	95% KM Bootstrap t UCL	0.00305
90% KM Chebyshev UCL	0.0034	95% KM Chebyshev UCL	0.00376
97.5% KM Chebyshev UCL	0.00427	99% KM Chebyshev UCL	0.00526

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.624	**Anderson-Darling GOF Test**
5% A-D Critical Value	0.736	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.178	**Kolmogorov-Smirnov GOF**
5% K-S Critical Value	0.237	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	5.361	k star (bias corrected MLE)	4.175
Theta hat (MLE)	4.8496E-4	Theta star (bias corrected MLE)	6.2271E-4
nu hat (MLE)	139.4	nu star (bias corrected)	108.6
Mean (detects)	0.0026		

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detects is small such as <1.0, especially when the sample size is small (e.g., <15-20)

For such situations, GROS method may yield incorrect values of UCLs and BTVs

This is especially true when the sample size is small.

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	6.0000E-4	Mean	0.00399
Maximum	0.01	Median	0.00305
SD	0.0031	CV	0.779
k hat (MLE)	2.126	k star (bias corrected MLE)	1.769
Theta hat (MLE)	0.00188	Theta star (bias corrected MLE)	0.00225
nu hat (MLE)	68.04	nu star (bias corrected)	56.62
Adjusted Level of Significance (β)	0.0335		
Approximate Chi Square Value (56.62, α)	40.32	Adjusted Chi Square Value (56.62, β)	38.76
95% Gamma Approximate UCL	0.0056	95% Gamma Adjusted UCL	0.00582

Estimates of Gamma Parameters using KM Estimates

Mean (KM)	0.0026	SD (KM)	9.2487E-4
Variance (KM)	8.5538E-7	SE of Mean (KM)	2.6699E-4
k hat (KM)	7.903	k star (KM)	6.463
nu hat (KM)	252.9	nu star (KM)	206.8
theta hat (KM)	3.2899E-4	theta star (KM)	4.0231E-4
80% gamma percentile (KM)	0.0034	90% gamma percentile (KM)	0.00397
95% gamma percentile (KM)	0.00448	99% gamma percentile (KM)	0.00555

Gamma Kaplan-Meier (KM) Statistics

Approximate Chi Square Value (206.81, α)	174.5	Adjusted Chi Square Value (206.81, β)	171.2
95% KM Approximate Gamma UCL	0.00308	95% KM Adjusted Gamma UCL	0.00314

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.815	**Shapiro Wilk GOF Test**	
10% Shapiro Wilk Critical Value	0.889	Detected Data Not Lognormal at 10% Significance Level	
Lilliefors Test Statistic	0.215	**Lilliefors GOF Test**	
10% Lilliefors Critical Value	0.215	Detected Data appear Lognormal at 10% Significance Level	

Detected Data appear Approximate Lognormal at 10% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.00256	Mean in Log Scale	-6.048
SD in Original Scale	8.6635E-4	SD in Log Scale	0.462
95% t UCL (assumes normality of ROS data)	0.00293	95% Percentile Bootstrap UCL	0.00291
95% BCA Bootstrap UCL	0.00286	95% Bootstrap t UCL	0.00291
95% H-UCL (Log ROS)	0.00334		

Statistics using KM estimates on Logged Data and Assuming Lognormal Distribution

KM Mean (logged)	-6.048	KM Geo Mean	0.00236
KM SD (logged)	0.496	95% Critical H Value (KM-Log)	2.046
KM Standard Error of Mean (logged)	0.143	95% H-UCL (KM -Log)	0.00347
KM SD (logged)	0.496	95% Critical H Value (KM-Log)	2.046
KM Standard Error of Mean (logged)	0.143		

DL/2 Statistics

DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	0.00253	Mean in Log Scale	-6.061
SD in Original Scale	8.7673E-4	SD in Log Scale	0.464
95% t UCL (Assumes normality)	0.00291	95% H-Stat UCL	0.00331

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 1% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.00307

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Toxaphene

General Statistics

Total Number of Observations	16	Number of Distinct Observations	1
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	1

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!
The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable Toxaphene was not processed!

trans-Chlordane

General Statistics

Total Number of Observations	16	Number of Distinct Observations	2
Number of Detects	0	Number of Non-Detects	16
Number of Distinct Detects	0	Number of Distinct Non-Detects	2

Warning: All observations are Non-Detects (NDs), therefore all statistics and estimates should also be NDs!
Specifically, sample mean, UCLs, UPLs, and other statistics are also NDs lying below the largest detection limit!

The Project Team may decide to use alternative site specific values to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable trans-Chlordane was not processed!

Zinc

General Statistics

Total Number of Observations	16	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	10.8	Mean	24.34
Maximum	50.9	Median	14.85
SD	16.46	Std. Error of Mean	4.114
Coefficient of Variation	0.676	Skewness	0.898

Normal GOF Test

Shapiro Wilk Test Statistic	0.687	**Shapiro Wilk GOF Test**
1% Shapiro Wilk Critical Value	0.844	Data Not Normal at 1% Significance Level
Lilliefors Test Statistic	0.377	**Lilliefors GOF Test**
1% Lilliefors Critical Value	0.248	Data Not Normal at 1% Significance Level

Data Not Normal at 1% Significance Level

Assuming Normal Distribution

95% Normal UCL		**95% UCLs (Adjusted for Skewness)**	
95% Student's-t UCL	31.55	95% Adjusted-CLT UCL (Chen-1995)	32.09
		95% Modified-t UCL (Johnson-1978)	31.7

Gamma GOF Test

A-D Test Statistic	2.215	**Anderson-Darling Gamma GOF Test**
5% A-D Critical Value	0.746	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.353	**Kolmogorov-Smirnov Gamma GOF Test**
5% K-S Critical Value	0.217	Data Not Gamma Distributed at 5% Significance Level

Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.78	k star (bias corrected MLE)	2.301
Theta hat (MLE)	8.754	Theta star (bias corrected MLE)	10.58
nu hat (MLE)	88.97	nu star (bias corrected)	73.62
MLE Mean (bias corrected)	24.34	MLE Sd (bias corrected)	16.05
		Approximate Chi Square Value (0.05)	54.86
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	53.02

Assuming Gamma Distribution

95% Approximate Gamma UCL	32.66	95% Adjusted Gamma UCL	33.79

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.742	**Shapiro Wilk Lognormal GOF Test**
10% Shapiro Wilk Critical Value	0.906	Data Not Lognormal at 10% Significance Level
Lilliefors Test Statistic	0.326	**Lilliefors Lognormal GOF Test**
10% Lilliefors Critical Value	0.196	Data Not Lognormal at 10% Significance Level

Data Not Lognormal at 10% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.38	Mean of logged Data	3.002
Maximum of Logged Data	3.93	SD of logged Data	0.611

Assuming Lognormal Distribution

95% H-UCL	34.14	90% Chebyshev (MVUE) UCL	35.36
95% Chebyshev (MVUE) UCL	40.55	97.5% Chebyshev (MVUE) UCL	47.74

99% Chebyshev (MVUE) UCL	61.88

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution

Nonparametric Distribution Free UCLs

95% CLT UCL	31.1	95% BCA Bootstrap UCL	32.96
95% Standard Bootstrap UCL	30.85	95% Bootstrap-t UCL	33.2
95% Hall's Bootstrap UCL	30.03	95% Percentile Bootstrap UCL	31.04
90% Chebyshev(Mean, Sd) UCL	36.68	95% Chebyshev(Mean, Sd) UCL	42.27
97.5% Chebyshev(Mean, Sd) UCL	50.03	99% Chebyshev(Mean, Sd) UCL	65.27

Suggested UCL to Use

95% Student's-t UCL	31.55

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Appendix D
Existing NPDES Permit

United States Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

AUTHORIZATION TO DISCHARGE AND DISPOSE BIOSOLIDS UNDER THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Clean Water Act, 33 U.S.C. §1251 et seq., as amended by the Water Quality Act of 1987, P.L. 100-4, the "Act", the

Municipality of Anchorage
John M. Asplund Water Pollution Control Facility

is authorized to discharge from a facility located at **Anchorage, Alaska** (latitude: 61° 12= 22.5"; longitude: 150° 01= 8.7")

to receiving waters named **Knik Arm of Cook Inlet**,

in accordance with the discharge point, effluent limitations, monitoring requirements and other conditions set forth herein and

is authorized to dispose biosolids by incineration and to a landfill at the Municipality of Anchorage Regional Landfill,

in accordance with the disposal site, specific limitations, monitoring requirements, management practices, and other conditions set forth herein.

This permit shall become effective August 2nd 2000.

This permit and the authorization to discharge and dispose biosolids shall expire at midnight, August 2nd 2005

Signed this 30th day of June 2000.

Sign by Michael Bussell for
Randall F. Smith, Director
Office of Water, Region 10
U.S. Environmental Protection Agency

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I. SPECIFIC LIMITATIONS AND REQUIREMENTS

A. Effluent Limitations

1. During the effective period of this permit, the permittee is authorized to discharge from outfall 001, subject to the restrictions set forth herein. This permit does not authorize the discharge of any waste streams, including spills and other unintentional or non-routine discharges of pollutants, that are not part of the normal operation of the facility as disclosed in the permit application, or any pollutants that are not ordinarily present in such waste streams.

2. There shall be no discharge of floating solids, visible foam, or oily wastes which produce a sheen on the surface of the receiving water.

3. The pH shall not be less than 6.5 standard units nor greater than 8.5 standard units.

4. The following effluent limits shall apply at all times:

Table 1. EFFLUENT LIMITATIONS

Effluent Parameter	Unit of Measurement	Monthly Average	Weekly Average	Maximum Daily
Biochemical Oxygen Demand (BOD_5)	mg/L	240	250	300
	lbs/day	72,100	75,100	90,100
Total Suspended Solids (TSS)	mg/L	170	180	190
	lbs/day	51,000	54,000	57,000
Fecal Coliform Bacteria[1]	colonies/100 mL	850[2]	---	---
Total Residual Chlorine[1]	mg/L	---	---	1.2

1 Reporting is required within 24-hours if the limitation is violated (see Part II.H.).
2 Geometric mean of at least five samples. Not more than 10% of the samples shall exceed 2600 FC MPN/mL.

B. Monitoring Requirements

1. Overview

The permittee shall implement the plant influent/effluent, water quality, biological, and toxics control monitoring programs as described below. The primary objectives of these programs are as follows:

- Determine compliance with the NPDES Permit
- Determine compliance with State water quality criteria
- Determine effectiveness of industrial pretreatment program
- Aid in assessing water quality at discharge point
- Characterize toxic substances
- Monitor plant performance
- Determine compliance with the regulatory criteria of Section 301(h) of the Clean Water Act
- Determine level of bacteria concentration in nearshore waters
- Monitor for changes in sediment quality (organic enrichment, grain size distribution alteration, and pollutant contamination)
- Determine if pollutants from the discharge are accumulating in exposed biological organisms
- Provide data for evaluating reissuance of this permit

2. Annual Reporting

In addition to the monthly Discharge Monitoring Report required under Part II.C. of this permit, an annual written report, covering the previous calendar year, shall be submitted to EPA by February 15 of each year. The annual report shall contain summaries of the receiving water quality monitoring data, and any sediment analyses or bioaccumulation results if required in the previous year. The report shall also include the toxic and pesticide data required under the influent/effluent monitoring program. In addition to summarizing the data the permittee shall also evaluate and interpret data in relation to the magnitude and ecological significance of observed changes in the parameters measured. Potential changes in water quality, sediment chemistry, and biological parameters over time and with distance from the outfall, shall be addressed. All reports will address compliance with water quality standards by using appropriate descriptive and statistical methods to test for and to describe any impacts of the effluent on water quality.

3. Influent, Effluent, and Sludge Monitoring Requirements

During the effective period of this permit, the following monitoring requirements shall apply:

Table 2. INFLUENT/EFFLUENT/SLUDGE MONITORING REQUIREMENTS

Effluent Parameter	Sample Location [1]	Sample Frequency	Sample Type
Flow	effluent	continuous	continuous
Total Residual Chlorine	effluent	continuous or every 2-4 hours	grab
DO	effluent	4/week	grab
BOD_5	influent & effluent	4/week	24-hour composite
TSS	influent & effluent	4/week	24-hour composite
Temperature	influent & effluent	4/week	grab
pH	influent & effluent	4/week	grab
Fecal Coliform Bacteria	effluent	3/week	grab
Total Ammonia as N	effluent	1/month	24-hour composite
Enterococci Bacteria	effluent	2 per year[2]	grab
Oil and Grease	effluent	2 per year	grab
Toxic Pollutants and Pesticides[3]	influent & effluent sludge	2 per year	24-hour composite
WET[4]	effluent	4 per year	24-hour composite

1 When influent and effluent sampling is required, samples shall be collected during the same 24-hour period.
2 Twice per year sampling in this table shall be conducted once during the dry conditions in summer and once during wet conditions.
3 See I.B.7. for additional pretreatment sampling requirements. Values for each metal shall be reported as "total" and "dissolved" for influent and effluent samples and as "total" for sludge samples.
4 See I.C. for additional sampling requirements.

Influent and effluent monitoring results shall be reported monthly as specified in Part II.C. (Reporting of Monitoring Results) with the exception of parameters sampled twice per year which shall be reported annually as specified in Part I.B.2. Heavy metals and cyanide results shall also be included in the Pretreatment reporting requirements as specified in Part II.D.

4. Receiving Water Quality Monitoring Requirements

a. Water Quality Sampling

Water quality must be monitored annually, during dry weather conditions in summer. Nonfixed stations will be sampled during cruises made during a consecutive flood and ebb tide. Each cruise shall be made by following the track of a drogue released above the diffuser. Data from a minimum of three cruises made on a single flood-tide and three cruises made on the ebb-tide shall be analyzed. Stations shall include, but not be limited to: Above the diffuser; as close to the zone of initial dilution (ZID) boundary as practicable (see Definitions for a description of ZID); at least one station in the channel in Knik Arm of Cook Inlet; and the shallow subtidal area (before the drogue grounds).

Three flood-tide control cruises shall be similarly conducted in conjunction with or as soon as practicable following the cruises described above. The control cruises shall begin at a fixed station having the same water depth as the outfall and located due north across Knik Arm from Pt. Woronzof, near Pt. Mackenzie.

The following parameters will be measured at the depths indicated for each station. Profile measurements shall be made at 1 m to 3 m intervals throughout the water column:

Table 3. Receiving Water Quality Monitoring

Surface (above 0.5 m)[1]	**Surface, Mid-depth, and Bottom**	**Profiling**
Fecal coliform bacteria[2]	Dissolved oxygen (DO)	pH
Color	Turbidity	Temperature
Total residual chlorine		Salinity

Table 3. Receiving Water Quality Monitoring		
Surface (above 0.5 m)[1]	**Surface, Mid-depth, and Bottom**	**Profiling**
Total aqueous hydrocarbons[3]		
Total aromatic hydrocarbons[3]		
Metals and cyanide[3,4]		

1. At each station where surface samples are collected, the presence or absence of the following shall be reported: Floating solids, visible foam in other than trace amounts, and oily wastes which produce a sheen on the surface of the receiving water.
2. All water samples for fecal coliform bacteria analyses shall be collected in a standard manner from within the surface (15-30 cm) layer.
3. Samples for these parameters shall be obtained at the first three stations along the first flood tide cruise only, for both the outfall and control location.
4. See I.B.7. for list of metals. Values for each metal shall be reported as "total" and "dissolved"

b. Intertidal Sampling for Bacteria

Monitoring of fecal coliform bacteria will be conducted at eight intertidal stations listed below during the summer in conjunction with the water quality monitoring program. Two replicate water samples will be gathered from the shallow waters (one to three feet deep at slack high water) at these stations. Sampling stations:

Table 4. Intertidal Sampling Stations			
Station No.	**Station Location[1]**	**Latitude**	**Longitude**
1	2000 m east	61° 12' 10"	149° 58' 55"
2	1200 m east	61° 12' 11"	149° 59' 50"
3	750 m east	61° 12' 15"	150° 00' 20"
4	250 m east-southeast	61° 12' 19"	150° 00' 52"
5	250 m south	61° 12' 15"	150° 01' 10"

Table 4. Intertidal Sampling Stations			
Station No.	**Station Location**[1]	**Latitude**	**Longitude**
6	750 m southeast	61° 12' 02"	150° 01' 28"
7	2000 m southwest	61° 11' 22"	150° 01' 28"
Control	North, across from diffuser (intertidal)	61° 14' 26"	150° 01' 8.7"

1. Distances and directions of the station locations are from the outfall diffuser and are guidelines. Exact locations used must be recorded and included in all data submissions.

5. Sediment Analyses

Sediment analyses shall be conducted in the summer during the fourth year after the effective date of this permit. The sampling shall be coordinated, to the extent practicable, with the sampling times for the water quality monitoring program and the bioaccumulation study. Samples of the top 2 cm will be collected from the following five stations: Intertidal Stations Number 1 and 2, and the Intertidal Control Station, all specified in Part I.B.4.b. above, a Subtidal Station located at the ZID boundary, and a Subtidal Control station located due north across Knik Arm from Pt. Woronzof, near Pt. Mackenzie, at a similar water depth as the ZID boundary. At each station, two samples will be collected and analyzed for the following: total volatile solids (TVS); toxic pollutants and pesticides; and sediment grain size distribution.

If sediment samples are collected from gravel or cobble substrates, analyses for grain size distributions shall be done on representative samples, but analyses for TVS and for pollutants and pesticides shall be done on the finer size fractions (silt and clay fractions, combined).

Data analyses shall be presented in the written report as mean values and standard deviations by stations, for each parameter measured.

6. Bioaccumulation

A bioaccumulation study shall be conducted in the summer during the fourth year after the effective date of this permit. The sampling shall be coordinated, to the extent practicable, with the sampling times for the water quality monitoring program and the sediment analysis. The intertidal yellow-brown macroalgae *Vaucheria* shall be sampled at two intertidal stations: Station Number 1 and the

Intertidal Control Station from Part I.B.4.b. above. Ten (10) replicate algal samples shall be collected at random distances and bearings within a 10 meter radius of the intertidal station. Each sample shall be analyzed for priority pollutant organics, total hydrocarbons, trace metals and cyanide.

7. Pretreatment Program Sampling Requirements

   a. The permittee shall sample influent, effluent, and sludge from its facility for the following parameters: percent solids (sludge only), arsenic, cadmium, chromium, copper, cyanide, lead, mercury, nickel, silver, and zinc. Metals must be analyzed and reported as total metals and dissolved metals.

   b. Sampling shall be conducted twice per year: once during wet conditions and once during the dry conditions.

   c. The permittee shall sample as described in the following table:

Table 5. Pretreatment Monitoring - Sample Types and Frequency

Wastestream	Sample Type	Frequency[1]
Influent	24-hour Composite	3 Consecutive days (Mon - Fri)
Effluent	24-hour Composite	3 Consecutive days (Mon - Fri)
Sludge	Composite of 8 grabs/day	Once, during the same time period that influent and effluent samples are being taken

1. The first day of the 3 consecutive days of sampling specified by this table are accomplished by the twice per year sampling for the same constituents specified in Table 2 of Section I.B.3.

   d. Sludge samples shall be taken as the sludge leaves the treatment processes and before mixing with sludge of different age in drying beds or in storage.

   e. Metals concentrations in sludge shall be reported in mg/kg, dry weight.

   f. Daily composite samples shall be analyzed and reported separately. Sample results shall be submitted with the pretreatment annual report required in Section II.D. below.

8. Monitoring Program Plan including Quality Assurance Requirements

   a. Within 90 days of the effective date of this permit, the permittee shall submit to EPA a Monitoring Program Plan that includes a Quality Assurance/Quality Control (QA/QC) program. This plan shall address the details of: 1) all monitoring procedures (e.g., methods to insure adequate preservation of composite samples, methods of station location and relocation, identification of sampling equipment), 2) monitoring objectives, 3) specific QA/QC procedures including the detection limits and precision requirements that will insure that program objectives are met, 4) how data will be used to evaluate the monitoring objectives, 5) name(s), address(es), and telephone number(s) of the laboratories, used by or proposed to be used by the permittee, and 6) other activities designed to achieve data quality goals for the monitoring programs.

   b. The document, *Guidance for Preparation of Quality Assurance Project Plans*, EPA, Region 10, Quality and Data Management Program, QA/G-5, may be used as a reference guide in preparing the QA/QC program. This document is available at http://www.epa.gov/r10earth/offices/oea/qaindex.htm.

   c. The permittee shall amend the Monitoring Program Plan whenever there is a modification in the sample collection, sample analysis, or other conditions or requirements of the plan.

   d. Copies of the Monitoring Program Plan shall be kept on site and shall be made available to EPA and ADEC upon request.

C. Whole Effluent Toxicity (WET) Testing Requirements.

The permittee shall conduct quarterly toxicity tests on 24-hour composite effluent samples.

1. Organisms and Protocols

   a.. The permittee shall conduct tests with a vertebrate and two invertebrate species, as follows for the first three suites of tests. After the screening period, monitoring shall be conducted using the most sensitive species only.

Vertebrate: Topsmelt, *Atherinops affinis* (survival and growth).

Invertebrate: Bivalve species, mussel, *Mytilis spp.* (survival and growth) or Pacific oyster, *Crassostrea gigas* (larval development test), and

Purple urchin, *Strongylocentrotus purpuratus* or sand dollar, *Dendraster excentricus* (fertilization test)

b. The presence of chronic toxicity shall be estimated as specified in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms*, EPA/600/4-87/028, May 1988, and/or *West Coast Marine Methods Manual, First Edition*, Eds. Chapman, G.A., D.L. Denton, and J.M. Lazorchak, EPA/600/R-95-136.

2. Each year the permittee shall re-screen for one quarter with three species and continue to monitor for the rest of the year with the most sensitive species. The screening shall occur in a different quarter than the previous year.

3. Results shall be reported in TUc (chronic toxic units). TUc = 100/NOEC.

4. Toxicity Triggers. For the purposes of determining compliance with Paragraphs 7 and 8 below, chronic toxicity testing requirements are triggered when chronic toxicity is greater than 143TUc.

5. Quality Assurance

a. A series of five dilutions and a control shall be tested. The series shall include the concentration of the effluent at the edge of the ZID. The concentration of the effluent at the edge of the ZID is 0.70%. The dilution series shall also include two dilutions above 0.70%, and two dilutions below 0.70%.

b. Concurrent testing with reference toxicants shall also be conducted if organisms are not cultured in-house. Otherwise, monthly testing with reference toxicants is sufficient. Reference toxicants shall be conducted using the same test conditions as the effluent toxicity tests (e.g., same test duration and type).

c. If the effluent tests do not meet all test acceptability criteria as specified in the manual, then the permittee must re-sample and re-test as soon as possible.

d. Control and dilution water shall be natural or synthetic seawater, as described in the manual. If the dilution water used is different from the culture water, a second control, using culture water shall also be used. Receiving water may be used as control and dilution water upon notification of EPA and ADEC. In no case shall water that has not met test acceptability criteria be used as dilution water.

6. Preparation of Initial Investigation Toxicity Reduction Evaluation (TRE) Plan

The permittee shall submit to EPA a copy of the permittee's initial investigation TRE workplan within 90 days of the effective date of this permit. This plan shall describe the steps the permittee intends to follow in the event that chronic toxicity as described in Part I.C.4. above, is detected, and should include at a minimum:

a. a description of the investigation and evaluation techniques that would be used to identify potential causes/sources of toxicity, effluent variability, treatment system efficiency;

b. a description of the facility's method of maximizing in-house treatment efficiency, good housekeeping practices, and a list of all chemicals used in operation of the facility; and

c. if a toxicity identification evaluation (TIE) is necessary, who will conduct it (i.e., in-house or other).

7. Accelerated Testing

a. If chronic toxicity as defined in Part I.C.4. above is detected during the quarterly tests, the permittee shall implement the initial investigation workplan. If implementation of the initial investigation workplan indicates the source of toxicity (for instance, a temporary plant upset), then only one additional test is necessary. If toxicity is detected in this test, then the following Part I.C.7.b. shall apply.

b. If toxicity is detected as defined in Part I.C.4. in the test required in Paragraph a. above, then the permittee shall conduct six more tests,

bi-weekly (every two weeks), over a twelve-week period. Testing shall commence within two weeks of receipt of the sample results of the exceedance.

8. TRE and Toxicity Identification Evaluation (TIE)

   a. If chronic toxicity as defined Part I.C.4. is detected in any of the six additional tests required under Part I.C.7.b., then, in accordance with the permittee's initial investigation workplan and EPA manual EPA 833-B-99-002 (*Toxicity Reduction Evaluation Guidance for Municipal Wastewater Treatment Plants*), the permittee shall initiate a TRE within fifteen (15) days of receipt of the sample results of the exceedance. The permittee will develop as expeditiously as possible a more detailed TRE workplan, which includes:

      i. further actions to investigate and identify the cause of toxicity;

      ii. actions the permittee will take to mitigate the impact of the discharge and to prevent the recurrence of toxicity; and

      iii. a schedule for these actions.

   b. The permittee may initiate a TIE as part of the overall TRE process described in the EPA acute and chronic TIE manuals EPA/600/6-91/005F (Phase I), EPA/600/R-92/080 (Phase II), and EPA-600/R-92/081 (Phase III).

   c. If none of the six tests required under Part I.C.7.b. above indicates toxicity, then the permittee may return to the normal testing frequency.

   d. If a TIE is initiated prior to completion of the accelerated testing, the accelerated testing schedule may be terminated, or used as necessary in performing the TIE.

9. Reporting

   a. The permittee shall submit the results of the toxicity tests, including any accelerated testing conducted during the month, in TUc with the discharge monitoring reports (DMR) for the month following the month in which the test is conducted. If an initial

investigation indicates the source of toxicity and accelerated testing is unnecessary, pursuant to Part I.C.7., then those results shall also be submitted with the DMR for the quarter in which the investigation occurred.

b. The full report shall be submitted by the end of the month following the month in which the DMR is submitted.

c. The full report shall consist of: the results; the dates of sample collection and initiation of each toxicity test; the triggers as defined in Part I.C.7. above; the type of activity occurring; the flow rate at the time of sample collection; and the chemical parameter monitoring required for the outfall(s) as defined in the permit.

d. Test results for chronic tests shall also be reported according to the chronic manual chapter on Report Preparation, and shall be attached to the DMR.

D. Sewage Sludge Management Requirements

The permittee is authorized by this permit to dispose of sewage sludge by means of incineration or, alternatively, by disposal at a landfill or by composting. In addition to sludge generated by the Asplund Facility, the facility may accept sludge generated by the following POTW's: Eagle River WWTF, Girdwood WWTF, City of Palmer, City of Wasilla, Talkeetna Service District, and City of Whittier. The following sludge management requirements shall apply:

1. The permittee shall handle and dispose of sewage sludge in such a manner so as to protect public health and the environment from any reasonably anticipated adverse effects due to any toxic pollutants which may be present in the sludge.

2. The permittee shall comply with all existing federal and state laws and regulations that apply to its sewage sludge use and disposal practice(s), and with all future standards promulgated under Section 405 (d) of the Clean Water Act of 1987.

3. The permittee shall ensure pollutants from the sludge do not reach surface waters of the United States.

4. Sludge from the facility may be transferred to the Asplund sewage sludge incinerator, for processing and disposal only in accordance with the requirements of this permit, and any current or future sludge requirements

contained in the operational permit(s) of the incinerator facility, including but not limited to:

a. The quality of the sludge and the method and delivery of the sludge shall be in compliance with any applicable requirements in the air pollution control permit of the Asplund sewage sludge incinerator.

5. Sludge from the facility may be transferred to the Municipality of Anchorage Regional Landfill, as an alternative use and disposal option only in accordance with the requirements of this permit, and any current or future sludge requirements contained in 40 CFR 258 or the operational permit(s) of the landfill facility, including but not limited to:

a. The sludge shall be deposited within or directly over the municipal solid waste landfill "unit" and not in a separate unit, pile, lagoon, or trench either exclusively for sludge, or in combination with some waste or material other than municipal solid waste.

b. The sludge shall have no "free liquids" as defined by EPA test method 9095 in *Test Methods for Evaluating Solid Wastes Physical/Chemical Methods* (EPA Pub.No. SW-846) in accordance with 40 CFR 258.28;

c. The sludge shall be characterized as non-hazardous in accordance with 40 CFR 258.20, and

d. The delivery, and any storage, handling, or processing of the sludge shall be conducted in accordance with the requirements of 40 CFR 258 for municipal solid waste landfill unit operations, and in accordance with any sludge requirements established in the operating permit(s), or operating approvals issued or established to implement 40 CFR 258.

6. Sludge from the facility may be transferred to a public or private composting facility. The permittee shall, to the extent practicable, ensure that the composting operation complies with the requirements of 40 CFR 503 Subpart B regarding sludge disposal. AWWU shall take corrective action should the composting facility fall out of compliance with these regulations. The permittee shall maintain a record of its efforts to comply with this paragraph.

7. Sludge delivery shall be suspended or discontinued upon receipt of written instructions from EPA. If any other appropriate authority submits a written request to the sludge generator or recipient facility to suspend or cease any activities associated with sludge management, or if they receive information indicating the recipient facility is not in compliance with the conditions of its operating permit(s), the permittee shall deliver a copy of this request or non-compliance information to EPA within 48 hours of receiving the request. The term "appropriate authority" includes any federal, state, or local agency with regulatory authority over sludge management at either the generator or recipient facility. The permittee may only resume delivery of sludge upon receipt of written authorization from EPA.

8. Any storage of sludge shall be performed in accordance with an NPDES stormwater permit as applicable, and any current or future federal and state standards or permits. Any storage must prevent disease transmission, vector attraction, or nuisance conditions.

9. This permit may be reopened to incorporate additional limits to prevent violations of the current or future operational permit(s) of the recipient facility, or harm to the environment or public health due to mismanagement of the sewage sludge.

10. The permittee shall notify the EPA 180 days prior to changing the sludge management practice.

11. The permittee shall submit a report to EPA on February 19 of each year that includes the following information:

    a. Amount of sludge (tons, dry weight) delivered to each recipient facility.

    b. Results of free liquid tests, and results of any other tests of the sludge such as for hazardous characteristics, total metals, or other parameters used to determine compliance with the requirements of this permit.

E. Pretreatment Program Requirements

1. The permittee shall implement its pretreatment program in accordance with the legal authorities, policies, procedures, staffing levels and financial provisions described in its original approved pretreatment program submission entitled ***Municipality of Anchorage Industrial Pretreatment Program*** **(approved April**

9, 1982), any program amendments submitted thereafter and approved by EPA, and the General Pretreatment Regulations (40 CFR 403) and any amendments thereof. At a minimum, the permittee shall undertake the following pretreatment implementation:

a. Enforce categorical pretreatment standards promulgated pursuant to Section 307(b) and (c) of the Act, prohibitive discharge standards as set forth in 40 CFR 403.5, or local limitations developed by the permittee in accordance with 40 CFR 403.5(c), whichever are more stringent or are applicable to non-domestic users discharging wastewater into the permittee's collection system. Locally derived limitations shall be defined as pretreatment standards under Section 307(d) of the Act.

b. Implement and enforce the requirements of the most recent and effective portions of local law and regulations (e.g. municipal code, sewer use ordinance) addressing the regulation of non-domestic users.

c. Update its inventory of non-domestic users at a frequency and diligence adequate to ensure proper identification of non-domestic users subject to pretreatment standards, but no less than once per year. The permittee shall notify these users of applicable pretreatment standards in accordance with 40 CFR 403.8(f)(2)(iii).

d. Issue, reissue, and modify, in a timely manner, industrial wastewater discharge permits to at least all Significant Industrial Users (SIUs) and categorical industrial users. These documents shall contain, at a minimum, conditions identified in 40 CFR 403.8(f)(1)(iii). The permittee shall follow the methods described in its implementation procedures for issuance of individual permits.

e. Develop and maintain a data management system designed to track the status of the permittee's non-domestic user inventory, non-domestic user discharge characteristics, and their compliance with applicable pretreatment standards and requirements. The permittee shall retain all records relating to its pretreatment program activities for a minimum of three years and shall make such records available to EPA upon request. The permittee shall also provide public access to information considered effluent data under 40 CFR Part 2.

f. Establish, where necessary, contracts or legally binding agreements with contributing jurisdictions to ensure compliance with applicable pretreatment requirements by non-domestic users within these jurisdictions. These contracts or agreements shall identify the agency

responsible for the various implementation and enforcement activities in the contributing jurisdiction. In addition, the permittee may be required to develop a Memorandum of Understanding that outlines the specific roles, responsibilities and pretreatment activities of each jurisdiction.

g. Carry out inspections, surveillance, and monitoring of non-domestic users to determine compliance with applicable pretreatment standards and requirements. A thorough inspection of SIUs shall be conducted at least annually.

h. Require SIUs to conduct wastewater sampling as specified in 40 CFR 403.12(e)(1). Frequency of wastewater sampling for the SIUs shall be commensurate with the character and volume of the wastewater, but shall not be less than twice per year. Sample collection and analysis shall be performed in accordance with 40 CFR 403.12 (b)(5)(ii) through (v) and 40 CFR Part 136. If the permittee elects to conduct all the non-domestic user monitoring for any SIU in lieu of requiring self-monitoring the permittee shall conduct sampling in accordance with the requirements of this paragraph.

i. Enforce and obtain remedies for any industrial user in non-compliance with applicable pretreatment standards and requirements. This shall include timely and appropriate reviews of industrial reports to identify all violations of the user's permit or the permittee's local ordinance. Once violations have been uncovered, the permittee shall take timely and appropriate action to address the noncompliance. The permittee's enforcement actions shall track its approved enforcement response procedures.

j. Publish, at least annually in the largest daily newspaper in the permittee's service area, a list of all non-domestic users which, at any time in the previous 12 months, were in Significant Non-Compliance as defined in 40 CFR 403.8 (f)(2)(vii).

k. Maintain adequate staff, funds and equipment to implement its pretreatment program.

l. Conduct an analysis to determine whether influent pollutant loadings are approaching the maximum allowable headworks loading in the permittee's local limits calculations. Any local limits found to be inadequate by this analysis shall be revised. The permittee may be required to revise existing local limits or develop new limits if deemed necessary by EPA.

2. The permittee shall implement an accidental spill prevention program to reduce and prevent spills and slug discharges of pollutants from non-domestic users.

3. Whenever, on the basis of information provided to EPA, it is determined that any source contributes pollutants to the permittee's facility in violation of subsection (b), (c), or (d) of Section 307 of the Act, notification shall be provided to the permittee. Failure by the permittee to commence an appropriate enforcement action within 30 days of this notification may result in appropriate enforcement action by the EPA against the source and permittee.

4. If the permittee elects to modify any components of its pretreatment program, it shall comply with the requirements of 40 CFR 403.18. No substantial program modification, as defined in 40 CFR 403.18(b), may be implemented prior to receiving written authorization from EPA.

5. Under no circumstances shall the permittee allow introduction of the following wastes into the waste treatment system:

   a. Wastes which will create a fire or explosion hazard in the treatment works;

   b. Wastes which will cause corrosive structural damage to the treatment works, but in no case, wastes with a pH lower than 5.0, unless the works is designed to accommodate such wastes;

   c. Solid or viscous substances in amounts which cause obstructions to the flow in sewers, or interference with the proper operation of the treatment works;

   d. Wastewater at a flow rate and/or pollutant discharge rate which is excessive over relatively short time periods so that there is a treatment process upset and subsequent loss of treatment efficiency; and

   e. Any pollutant, including oxygen demanding pollutants (BOD_5, etc.) released in a discharge of such volume or strength as to cause interference in the treatment works.

6. The permittee shall require any industrial user of its treatment works to comply with any applicable requirements of Sections 204(b), 307, and 308 of the Act, including any requirements established under 40 CFR Part 403.

F. Nonindustrial Source Control Program

The permittee shall implement the following nonindustrial source control program:

1. Implement and enforce ordinances to control the introduction of toxic pollutants from nonindustrial sources to the wastewater collection system.

2. Develop and publish disposal guidelines specifying what toxic pollutants can and cannot be discharged to the sewer system and identifying alternative disposal methods for prohibited pollutants.

3. Implement the control program for nonindustrial sources as contained the pretreatment program approved by EPA on April 9, 1982. As part of this program, the following shall be addressed: development of control programs for specific nonindustrial categories of sources, including a program description, method of enforcement, monitoring program, and schedule for implementation.

4. Provide alternative disposal methods for nonindustrial toxic pollutants such as the annual hazardous waste cleanup program.

5. Implement a hazardous waste management plan for small quantity generators.

6. Reporting: A report on the nonindustrial source control program shall be submitted along with each annual pretreatment report. This report shall include, for each of the above activities, its implementation status and its effectiveness in minimizing nonindustrial inputs of toxic pollutants and pesticides.

G. Operation and Maintenance Plan Review

1. Within 180 days after the effective date of this permit, the permittee shall review its operation and maintenance (O&M) plan and ensure that it includes appropriate best management practices (BMPs); the plan must be reviewed annually thereafter. BMPs include measures which prevent or minimize the potential for the release of pollutants to Knik Arm of Cook Inlet. The O&M Plan shall be retained on site and made available to EPA and ADEC upon request.

2. The permittee shall develop a description of pollution prevention measures and controls appropriate for the facility. The appropriateness and priorities of controls in the O&M Plan shall reflect identified potential sources of pollutants at the facility. The description of BMPs shall address, to the extent practicable, the following minimum components:

   - Spill prevention and control;
   - Optimization of chemical usage;
   - Preventive maintenance program;
   - Minimization of pollutant inputs from industrial users;
   - Research, develop and implement a public information and education program to control the introduction of household hazardous materials to the sewer system; and
   - Water conservation.

H. Definitions

1. "Average monthly discharge limitation" means the highest allowable average of "daily discharges" over a calendar month, calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

2. "Average weekly discharge limitation" means the highest allowable average of "daily discharges" over a calendar week, calculated as the sum of all "daily discharges" measured during a calendar week divided by the number of "daily discharges" measured during that week.

3. "Biosolids" means any sludge or material derived from sludge that can be beneficially used. Beneficial use includes, but is not limited to, land application to agricultural land, forest land, a reclamation site or sale or give away to the public for home lawn and garden use.

4. "Chronic toxicity" measures a sublethal effect (e.g., reduced growth, reproduction) in an effluent or ambient waters compared to that of the control organisms.

5. "Chronic toxic unit (TU_c)" is a measure of chronic toxicity. The number of chronic toxic units in the effluent is calculated as 100/NOEC, where the NOEC is measured in percent effluent.

6. "Daily discharge" means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

7. "Dry Weight-basis" means 100 percent solids (i.e., zero percent moisture).

8. A "Grab" sample is a single sample or measurement taken at a specific time or over as short a period of time as is feasible.

9. "Inhibition concentration (IC)" is a point estimate of the toxicant concentration that causes a given percent reduction (p) in a non-quantal biological measurement (e.g., reproduction or growth) calculated from a continuous model (e.g., the EPA Interpolation Model).

10. "IC_{25}" means the estimated toxicant concentration that would cause a 25 percent reduction in a nonlethal biological measurement of the test organisms, such as reproduction or growth.

11. "Maximum daily discharge limitation" means the highest allowable "daily discharge".

12. "Method detection limit (MDL)" is the minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero as determined by a specific laboratory method (40 CFR 136).

13. "No observed effect concentration (NOEC)" is the highest concentration of toxicant to which organisms are exposed in a chronic test, that causes no observable adverse effect on the test organisms (e.g., the highest concentration of toxicant to which the values for the observed responses are not statistically significant different from controls.)

14. "Pathogen" means an organism that is capable of producing an infection or disease in a susceptible host.

15. "Pollutant", for the purposes of this permit, is an organic substance, an inorganic substance, a combination of organic and inorganic substances, or pathogenic organisms that, after discharge and upon exposure, ingestion, inhalation, or assimilation into an organism either directly from the environment or indirectly by ingestion through the food-chain, could, on the basis of information available to the Administrator of EPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunction in reproduction), or physical deformations in either organisms or offspring of the organisms.

16. "Sewage sludge" means solid, semi-solid, or liquid residue generated during the treatment of domestic sewage and/or a combination of domestic sewage and industrial waste of a liquid nature in a Treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the incineration of sewage sludge or grit and screenings generated during preliminary treatment of domestic sewage in a Treatment Works. These must be disposed of in accordance with 40 CFR 258.

17. "Suites of tests" means the two or three species used for testing during the permit term.

18. A "24-hour composite" sample shall mean a flow-proportioned mixture of not less than eight discrete aliquots. Each aliquot shall be a grab sample of not less than 100 mL and shall be collected and stored in accordance with procedures prescribed in the most recent edition of *Standard Methods for the Examination of Water and Wastewater*.

19. A "TRE" is a site-specific study conducted in a stepwise process to narrow the search for effective control measures for effluent toxicity.

20. "Toxic pollutants" are those substances listed in 40 CFR 401.15.

21. "Pesticides" are Demeton, Guthion, Malathion, Mirex, Methoxychlor and Parathion (as listed in 40 CFR 125.58).

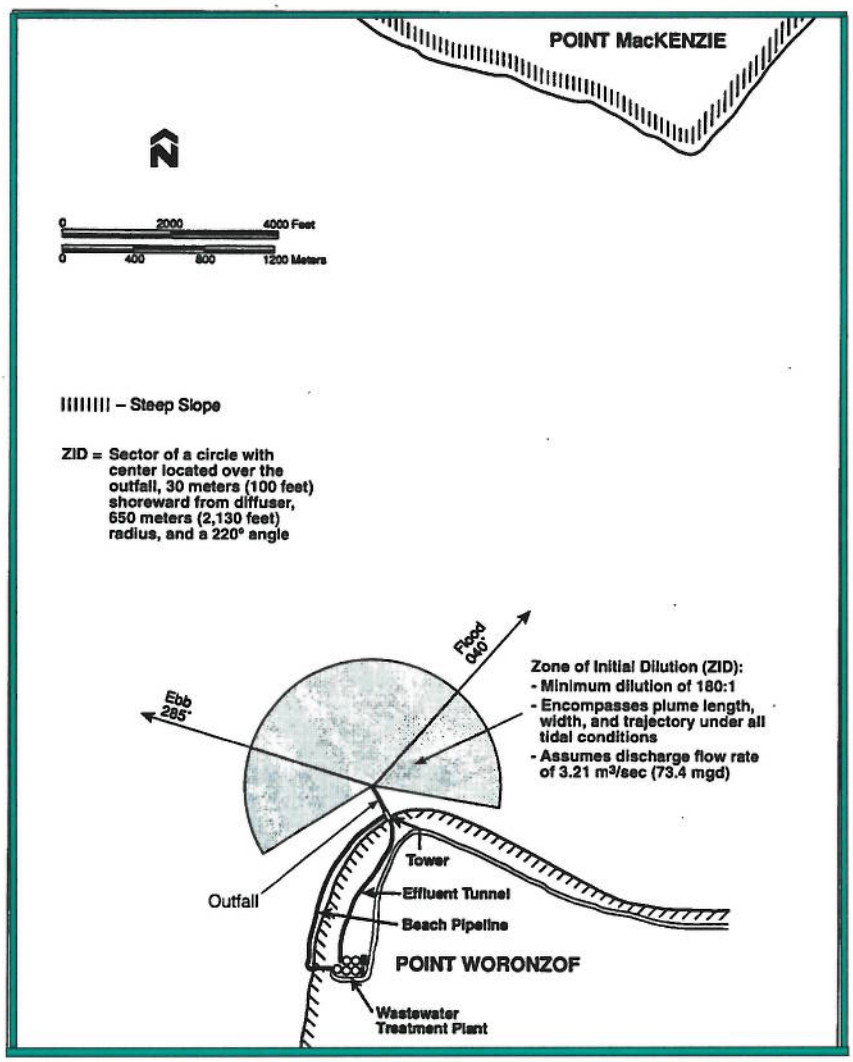
22. "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent

limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

23. "Vector attraction" is the characteristic of sewage sludge that attracts rodents, flies, mosquitos or other organisms capable of transporting infectious agents.

24. The "ZID" is the Zone of Initial Dilution. The ZID is defined by (1) a sector of a circle with a center located over the outfall, 30 m (100 ft) shoreward of the diffuser, 650 m (2,130 ft) radius, and a 220° angle, as shown in Figure 1, and (2) the water column above that area.

Figure 1. The Zone of Initial Dilution (ZID) for the Point Woronzof Outfall



II. MONITORING, RECORDING, AND REPORTING REQUIREMENTS

A. Representative Sampling. Samples taken in compliance with the monitoring requirements established under Part I shall be collected from the effluent stream prior to discharge into the receiving waters. Samples and measurements shall be representative of the volume and nature of the monitored discharge.

B. Monitoring Procedures. Monitoring must be conducted according to test procedures approved under 40 CFR 136, unless other test procedures have been specified in this permit.

C. Reporting of Monitoring Results. Monitoring results shall be summarized each month on the Discharge Monitoring Report (DMR) form. The reports shall be submitted monthly and are to be postmarked by the 10th day of the following month. Legible copies of these, and all other reports, shall be signed and certified in accordance with the requirements of Part IV.J. Signatory Requirements, and submitted to the Director, Office of Water and the State agency at the following addresses:

original to: United States Environmental Protection Agency (EPA)
Region 10
NPDES Compliance Unit
1200 Sixth Avenue, OW-133
Seattle, Washington 98101

copy to: Alaska Department of Environmental Conservation
Division of Air and Water Quality
555 Cordova Street
Anchorage, Alaska 99503
(907)269-7523
(907)269-7508 fax

D. Pretreatment Report

1. The permittee shall submit an annual report that describes the permittee's program activities over the previous calendar year. This report shall be submitted to the following address no later than February 15 of each year:

Pretreatment Coordinator
U.S. Environmental Protection Agency Region 10
1200 Sixth Avenue, OW-130
Seattle, WA 98101

2. The pretreatment report shall be compiled following the *Region 10 Annual Report Guidance*. At a minimum, the report shall include:

   a. An updated non-domestic user inventory, including new businesses appropriately categorized and characterized. The permittee shall also list those facilities that have been dropped from the inventory, along with the reason they are no longer discharging.

   b. Results of pretreatment program sampling at the treatment plant as specified in Part I.B.7.

   c. Calculations of removal rates for each pollutant for each day of pretreatment program sampling.

   d. An analysis and discussion of whether the existing local limitations in the permittee's sewer use ordinance continue to be appropriate to prevent treatment plant interference and pass through of pollutants that could affect water quality or sludge quality.

   e. Status of program implementation, including:

      i) Any planned modifications to the pretreatment program originally approved by EPA, including staffing and funding updates.

      ii) Any interference, upset, or NPDES permit violations experienced at the facility directly or indirectly attributable to non-domestic users.

      iii) Listing of non-domestic users inspected and/or monitored during the previous year with a summary of compliance status.

      iv) Listing of non-domestic users planned for inspection and/or monitoring for the next year along with associated frequencies.

      v) Listing of non-domestic users whose permits have been issued, reissued, or modified.

      vi) Listing of non-domestic users notified of promulgated pretreatment standards and/or local standards as required in 40 CFR Part 403.8(f)(2)(iii).

vii) Listing of non-domestic users notified of promulgated pretreatment standards or applicable local standards who are on compliance schedules. The listing must include the final date of compliance for each facility.

f. Status of enforcement activities including:

i) Listing of non-domestic users who failed to comply with applicable pretreatment standards and requirements, including:

a. Summary of the violation(s).

b. Enforcement action taken or planned by the permittee.

c. Present compliance status as of the date of preparation of the pretreatment report.

ii) Listing of those users in Significant Non-Compliance and a copy of the newspaper publication of those users' names.

EPA may require more frequent reporting on those users who attain a level of Significant Non-Compliance.

E. Additional Monitoring by the Permittee. If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR 136 or as specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR. Such increased frequency shall also be indicated.

F. Records Contents. Records of monitoring information shall include:

1. The date, exact place, and time of sampling or measurements,

2. The individual(s) who performed the sampling or measurements,

3. The date(s) analyses were performed,

4. The individual(s) who performed the analyses,

5. The analytical techniques or methods used, and

6. The results of such analyses.

G. Retention of Records. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report, or application. This period may be extended by request of the Director at any time. Data collected on-site, copies of DMRs, and a copy of this NPDES permit must be maintained on-site during the duration of activity at the permitted location.

H. Twenty-four Hour Notice of Noncompliance Reporting

1. The following occurrences of noncompliance shall be reported to EPA and ADEC by telephone within 24 hours from the time the permittee becomes aware of the circumstances:

   a. Any unanticipated bypass which exceeds any effluent limitation in the permit (See Part **III.G. Bypass of Treatment Facilities**),

   b. Any upset which exceeds any effluent limitation in the permit (See Part **III.H. Upset Conditions**), or

   c. Violation of a maximum daily discharge limitation for those toxic or hazardous pollutants identified within Table1 of Section I.A.

2. A written submission shall also be provided to EPA and ADEC within five days of the time that the permittee becomes aware of the circumstances. The written submission shall contain:

   a. A description of the noncompliance and its cause;

   b. The period of noncompliance, including exact dates and times,

   c. The estimated time noncompliance is expected to continue if it has not been corrected, and

   d. Steps taken or planned to reduce, eliminate, and prevent re-occurrence of the noncompliance.

3. The Director may waive the written report on a case-by-case basis if the oral report has been received within 24 hours by the NPDES Compliance Unit in Seattle, Washington, by phone, (206) 553-1846.

4. Reports shall be submitted to the addresses in Part **II.C. Reporting of Monitoring Results.**

I. Other Noncompliance Reporting. Instances of noncompliance not required to be reported within 24 hours shall be reported at the time that monitoring reports for Part II.C. are submitted. The reports shall contain the information listed in Part II.H.2.

J. Inspection and Entry. The permittee shall allow the Director or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon the presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit,

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit,

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit, and

4. Sample or monitor at reasonable times, for the purpose of assuring permit compliance or as otherwise authorized by the Act, any substances or parameters at any location.

III. COMPLIANCE RESPONSIBILITIES

A. Duty to Comply. The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Act and is grounds for: enforcement action; permit termination, revocation and re-issuance, or modification; or denial of a permit renewal application. The permittee shall give advance notice to the Director and ADEC of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

B. Penalties for Violations of Permit Conditions

1. Civil and Administrative Penalties. Any person who violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act shall be subject to a civil or administrative penalty, not to exceed the maximum amounts authorized by Sections 309(d) and 309(g) of the Act and the Federal Civil Penalties Inflation Adjustment Act (28 U.S.C. § 2461 note) as amended by the Debt Collection Improvement Act (31 U.S.C. § 3701 note).

2. Criminal Penalties

   a. Negligent Violations. Any person who negligently violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act shall, upon conviction, be punished by a fine and/or imprisonment as specified in Section 309(c)(1) of the Act.

   b. Knowing Violations. Any person who knowingly violates a permit condition implementing Sections 301, 302, 306, 307, 308, 318, or 405 of the Act shall, upon conviction, be punished by a fine and/or imprisonment as specified in Section 309(c)(2) of the Act.

   c. Knowing Endangerment. Any person who knowingly violates a permit condition implementing Sections 301, 302, 303, 306, 307, 308, 318, or 405 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine and/or imprisonment as specified in Section 309(c)(3) of the Act .

   d. False Statements. Any person who knowingly makes any false material statement, representation, or certification in any application, record, report, plan, or other document filed or required to be maintained under this Act or who knowingly falsifies, tampers with, or renders inaccurate any monitoring device or method required to be maintained under this Act, shall, upon conviction, be punished by a fine and/or imprisonment as specified in Section 309(c)(4) of the Act.

C. Need to Halt or Reduce Activity not a Defense. It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

D. Duty to Mitigate. The permittee shall take all reasonable steps to minimize, or prevent, any discharge, or sludge use or disposal, in violation of this permit which

has a reasonable likelihood of adversely affecting human health or the environment.

E. Proper Operation and Maintenance. The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed, or used, by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.

F. Removed Substances. Collected screenings, grit, solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of waste waters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

G. Bypass of Treatment Facilities

1. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2 and 3 of this section.

2. Notice

a. Anticipated Bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible, at least 10 days before the date of the bypass.

b. Unanticipated Bypass. The permittee shall submit notice of an unanticipated bypass as required under Part **II.G. Twenty-four Hour Notice of Noncompliance Reporting.**

3. Prohibition of Bypass

a. Bypass is prohibited and the Director may take enforcement action against a permittee for a bypass, unless:

(1) The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage,

(2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgement to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance, and

(3) The permittee submitted notices as required under paragraph 2 of this section.

b. The Director may approve an anticipated bypass, after considering its adverse effects, if the Director determined that it will meet the three conditions listed above in paragraph 3.a. of this section.

H. Upset Conditions

1. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph 2 of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

2. Necessary upset demonstration conditions. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

a. An upset occurred and that the permittee can identify the cause(s) of the upset,

b. The permitted facility was at the time being properly operated,

c. The permittee submitted notice of the upset as required under Part **II.H. Twenty-four Hour Notice of Noncompliance Reporting**, and

d. The permittee complied with any remedial measures required under Part **III.D. Duty to Mitigate.**

3. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

IV. GENERAL REQUIREMENTS

A. Notice of New Introduction of Pollutants

1. The permittee shall provide adequate notice to the Director, Office of Water, and ADEC of:

   a. Any new introduction of pollutants into the treatment works from an indirect discharger which would be subject to sections 301 or 306 of the Act if it were directly discharging those pollutants, and

   b. Any substantial change in the volume or character of pollutants being introduced into the treatment works by a source introducing pollutants into the treatment works at the time of issuance of the permit.

2. For the purposes of this section, adequate notice shall include information on:

   a. The quality and quantity of effluent to be introduced into such treatment works, and

   b. Any anticipated impact of the change on the quantity or quality of effluent to be discharged from such publicly owned treatment works.

B. Control of Undesirable Pollutants. Under no circumstances shall the permittee allow introduction of the following wastes into the waste treatment system:

1. Wastes which will create a fire or explosion hazard in the treatment works;

2. Wastes which will cause corrosive structural damage to the treatment works, but in no case, wastes with a pH lower than 5.0, unless the treatment works is designed to accommodate such wastes;

3. Solid or viscous substances in amounts which cause obstructions to the flow in sewers, or interference with the proper operation of the treatment works;

4. Waste waters at a flow rate and/or pollutant discharge rate which is excessive over relatively short time periods so that there is a treatment process upset and subsequent loss of treatment efficiency; and

5. Any pollutant, including oxygen demanding pollutants (e.g., BOD, etc.) released in a discharge of such volume or strength as to cause interference in the treatment works.

C. Requirements for Industrial Users. The permittee shall require any industrial user of these treatment works to comply with any applicable requirements of sections 204(b), 307, and 308 of the Act, including any requirements established under 40 CFR 403.

D. Planned Changes. The permittee shall give notice to the Director and ADEC as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when the alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are not subject to effluent limitations in the permit. Notice is also required when the alteration or addition results in a significant change in the permittee's sludge use or disposal practices, including notification of additional use or disposal sites not reported during the permit application process.

E. Anticipated Noncompliance. The permittee shall give advance notice to the Director and ADEC of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

F. Permit Actions. This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and re-issuance, termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

G. Duty to Reapply. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application should be submitted at least 180 days before the expiration date of this permit.

H. Duty to Provide Information. The permittee shall furnish to the Director, within a reasonable time, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.

I. Other Information. When the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or any report to the Director or ADEC, it shall promptly submit such facts or information.

J. Signatory Requirements

1. All applications, reports, or information submitted to the Director shall be signed and certified.

2. All permit applications shall be signed by either a principal executive officer or ranking elected official.

3. All reports required by the permit and other information requested by the Director shall be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:

   a. The authorization is made in writing by a person described above and submitted to the Director, and

   b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position).

4. Changes to authorization. If an authorization under paragraph IV.J.3 is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph IV.J.3. must be submitted to the Director prior to, or together with, any reports, information, or applications to be signed by an authorized representative.

5. Certification. Any person signing a document under this section shall make the following certification:

   "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the

information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

K. Availability or Reports. Except for data determined to be confidential under 40 CFR 2, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the Director. As required by the Act, permit applications, permits, and effluent data shall not be considered confidential.

L. Oil and Hazardous Substance Liability. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under section 311 of the Act.

M. Property Rights. The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private infringement of federal, state, or local laws or regulations.

N. Severability. The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

O. Transfers. This permit may be automatically transferred to a new permittee if:

1. The current permittee notifies the Director at least 30 days in advance of the proposed transfer date,

2. The notice includes a written agreement between the existing and new permittee's containing a specific date for transfer of permit responsibility, coverage, and liability between them, and

3. The Director does not notify the existing permittee and the proposed new permittee of his or her intent to modify, or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in paragraph 2 above.

P. State Laws. Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable state law or regulation under authority preserved by section 510 of the Act.

Q. Reopener Provision. This permit is subject to modification, revocation and reissuance, or termination at the request of any interested person (including the permittee) or upon EPA initiative. However, permits may only be modified, revoked or reissued, or terminated for the reasons specified in 40 CFR Parts 122.62, 122.63 or 122.64, and 40 CFR Part 124.5. This includes new information which was not available at the time of permit issuance and would have justified the application of different permit conditions at the time of issuance and includes, but is not limited to, future monitoring results. All requests for permit modification must be addressed to EPA in writing and shall contain facts or reasons supporting the request.

REEVES AMODIO LLC
ATTORNEYS AT LAW

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E-Mail
susan@reevesamodio.com

July 15, 2011

David Ryland
Alaska Department of Fish and Game
Division of Habitat
333 Raspberry Road, Suite 2068
Anchorage, AK 99518-1565

Re: John M. Asplund Water Pollution Control Facility
Asplund Water Pollution Control Facility Outfall
EPA NPDES No.: AK-002255-1
Special Area Permit FG 05-II-0011

500 L
STREET
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ANCHORAGE
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Dear Mr. Ryland:

On June 30, 2000, the United States Environmental Protection Agency (EPA) issued an NPDES permit to the Municipality of Anchorage (Municipality) that authorized the operation by the Anchorage Water and Wastewater Utility (AWWU) of the John M. Asplund Facility at Point Woronzof. The term of that permit was five years. In 2005, the Municipality submitted a timely application for reauthorization of that NPDES permit. As part of that reauthorization process, AWWU applied for a Special Area Permit from the Alaska Department of Fish and Game (ADF&G) to occupy a portion of the Anchorage Coastal Wildlife Refuge to continue to operate and to discharge treated wastewater from a preexisting outfall structure located within the refuge. On February 23, 2005, ADF&G issued a Special Use Permit, referenced above. AWWU understood that the permit would remain in effect for the same term as the NPDES permit and would be renewed when the NPDES permit was renewed.

EPA has administratively extended the 2005 NPDES permit. The Municipality has been working with EPA on the renewal. The purpose of this letter is to confirm that the Special Use Permit continues to authorize operation of the outfall and the discharge of treated wastewater throughout the term of the now-extended NPDES permit and throughout the term of the renewed permit. This will assure that the two linked permits (the NPDES and the Special Use Permit) remain on the same renewal schedule. We propose that, in any event, the term of the current Special Use Permit extend no later than July 1, 2021. AWWU will formally seek a renewal of the permit if it makes any changes to the outfall or to the discharge in accordance with the renewed NPDES permit.

The Municipality has complied fully with the terms and conditions of the permit. There have been no changes to the outfall or to its operation since the permit issued.

Sincerely,

REEVES AMODIO LLC

Susan E. Reeves

Appendix E
Additional Details for Species Considered Rare in the Action Area

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E.1 Introduction

This Appendix provides additional details regarding species expected to be only rarely encountered in or the near the action area. Species both likely to be encountered and infrequently encountered in the action area are described in detail in Section 5 of the BE.

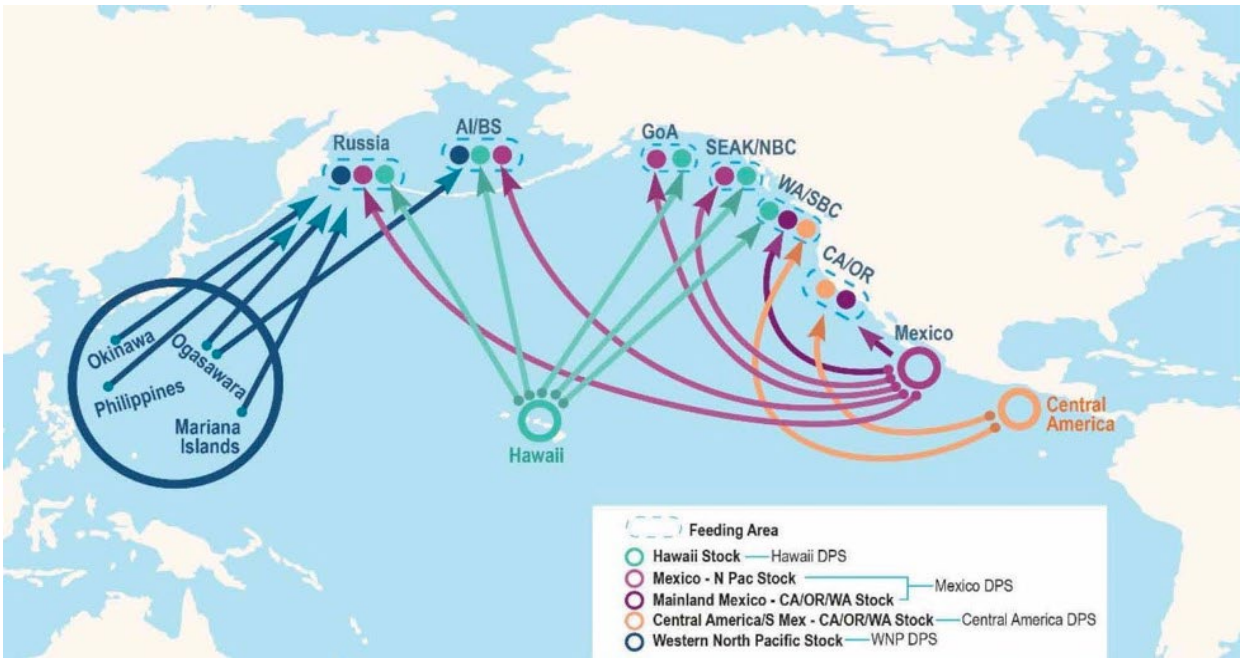
E.2 Humpback Whales

As summarized by Clapham (2009) and citations therein, humpback whales are large baleen whales with females slightly larger than males. Adult lengths are 16-17 m and calves are about 4 m. Humpback whales are easily recognized at close range by their extremely long flippers, which may be one-third the length of the body. The flippers are white on the bottom and may be white or black on top, depending on the population. The body is black on top with variable coloration ventrally and on the sides. The head and jaws have numerous knobs that are diagnostic for the species. The dorsal fin is small and variable in shape. The underside of the tail exhibits a pattern of white to black that is individually identifiable. The baleen is primarily black and occurs in 270-400 plates on each side of the mouth (Clapham 2009).

On September 8, 2016, NMFS issued a final rule which revised the global listing status of the humpback whale by dividing the species into 14 distinct DPSs (81 FR 62260). In 2022, NMFS further refined humpback whale stock structure based on feeding area and migratory routes, and recognized four DPSs in north Pacific waters: the Western North Pacific DPS (endangered); the Mexico DPS (threatened;) the Central America DPS (endangered); and the Hawaii DPS (not listed under the ESA) (Carretta *et al.* 2023, Young *et al.* 2023). Figure E-1 shows the feeding areas and migration patterns of the recognized North Pacific humpback whale stocks and DPSs.

In prior stock assessments, NMFS had designated three stocks of humpback whales in the north Pacific: the California/Oregon/Washington stock; the Central North Pacific stock; and the Western North Pacific stock. These stocks were not necessarily aligned with the ESA DPSs because some were composed of whales from more than one DPS, which led NMFS to reevaluate stock structure under the Marine MMPA as described above (Carretta *et al.* 2023, Young *et al.* 2023).

Figure E-1. North Pacific Humpback Whale Stocks



Source: Carretta *et al.* (2023), Young *et al.* (2023).

E.2.1 Distribution, Local Movements and Occurrence Near Point Woronzof

As shown Figure E-1, individuals from the threatened Mexico/North Pacific stock, which is part of the Mexico DPS, and the non-listed Hawaii stock migrate to the Gulf of Alaska and have the potential to enter the waters of Cook Inlet. According to Wade *et al.* (2021), only about 11% of humpback whales that occur in the Gulf of Alaska (and therefore potentially in Cook Inlet) could be from the threatened Mexico DPS, and the remaining 89% are assumed to be from the non-listed Hawaii DPS (NMFS 2021d).

Humpback whales, most likely from the non-listed Hawaii DPS, have been observed at the mouth of and within lower Cook Inlet, more than 250 km south of the action area (Fairweather Science 2020). Monitoring for marine mammals during lower Cook Inlet seismic surveys in 2019 documented 14 sightings of 38 individual humpback whales between Anchor Point and Iniskin Peninsula in lower Cook Inlet about 180 km south of the action area. During monitoring for a 2018 pipeline replacement project, two sightings of three humpback whales were documented near Ladd Landing, near Beluga, Alaska (Sitkiewicz *et al.* 2018), approximately 50 km east of the action area. Based on these observations, there is a potential for humpback whales to be infrequently or rarely encountered in the immediate vicinity of the action area near Point Woronzof.

E.2.2 Abundance and Trends

As shown in Figure-F-1, whales from the ESA-listed Mexico North Pacific stock migrate to the Bering Sea and Gulf of Alaska. Wade (2021) conducted multi-strata analysis of 2004-2006 Structures of Population, Levels of Abundance and Status of Humpback Whales (SPLASH) data and estimated the population of this stock to be 918 animals (CV=0.217).

However, the data used for this estimate are more than 8 years old, and thus the N_{MIN} estimate of the stock should be considered unknown (NMFS 2016a). Because N_{MIN} is considered unknown, PBR is undetermined.

For shelf waters of the northern Gulf of Alaska, Zerbini *et al.* (2006) estimated an annual rate of increase in humpback whale abundance of 6.6% (95% CI:5.2-8.6%) from 1987 to 2003. Teerlink *et al.* (2015) estimated an average annual rate of increase of 4.53% (95 % CI 3.28-5.79%) over the period 1978-2009 for humpback whales in Prince William Sound. These areas include a mixture of whales from Hawaii, Mexico, and Asia and do not reflect the trend of a single stock; therefore, it is unknown whether the Mexico/North Pacific stock is currently increasing (Young *et al.* 2023).

E.2.3 Status and Risks

The Mexico/North Pacific stock of humpback whales is one of two stocks that comprise the Mexico DPS of humpback whales: both are listed as threatened under the ESA (Bettridge *et al.* 2015, Martien *et al.* 2021).

Potential risks to this stock that would be most likely to result in direct mortality or serious injury include vessel strikes and entanglement in fishing gear and marine debris (Young et al. 2023). Freed et al. (2023) reported five encounters with humpback whales from either the Mexico/North Pacific stock or Hawaii stock of humpback whales in the Gulf of Alaska over the period 2017-2023. None of the encounters were was fatal. One whale was struck by a vessel resulting in an undetermined severity of injury. The remaining four encounters consisted of entanglement or entrapment in fishing gear, one of which was determined to have resulted in a severe injury. The others were either not severe or of unknown severity (Freed et al. 2023).

Van Aswegen *et al.* (2024) studied the inter- and intra-annual variations in foraging humpback whale body condition. the authors noted the following declines in abundance and reproductive output:

- a 76% decline in mother-calf abundance on principal breeding grounds of Maui, Hawaii;
- a 56-72% decline in humpback whale abundance in Glacier Bay (Alaska); and
- an 85% decrease in calf production and tenfold decrease in calf survival in Southeast Alaska.

Using non-invasive drones in southeast Alaska waters over the period 2019-2022 to measure humpback body size and width, the authors quantified whale size and condition. The key findings of the study were that lactating females had the lowest and most variable body condition index over the three years. On average, the body condition index of lactating females increased at a rate 5 times lower than mature adults, and the body condition index of adult humpback whales in southeast Alaska waters was significantly lower in 2021 than previous years (Van Aswegen *et al.* 2024).

E.2.4 Prey and Foraging

Prey species include euphausiids (*Thysanoessa, Euphausia, Nyctiphanes, and Nematoscelis*) and quantities of small pelagic schooling fishes such as Pacific sardine (*Sardinops sagax*), northern anchovy (*Engraulis mordax*), and Pacific herring (*Clupea pallasii*) (NMFS 2021b). Although humpback whales have been recorded to dive as deep as about 500 m, on feeding grounds they

spend the majority of their time in the upper 122 m of the water column. On the wintering grounds they dive deeper to 176 m or greater. Like other large mysticetes, they are "lunge feeders" taking advantage of dense prey patches and engulfing as much food as possible in a single gulp (Clapham 2009). They also blow nets, or curtains, of bubbles around or below prey patches to concentrate the prey in one area, then lunge with mouths open through the middle (Clapham 2009).

E.2.5 Acoustics

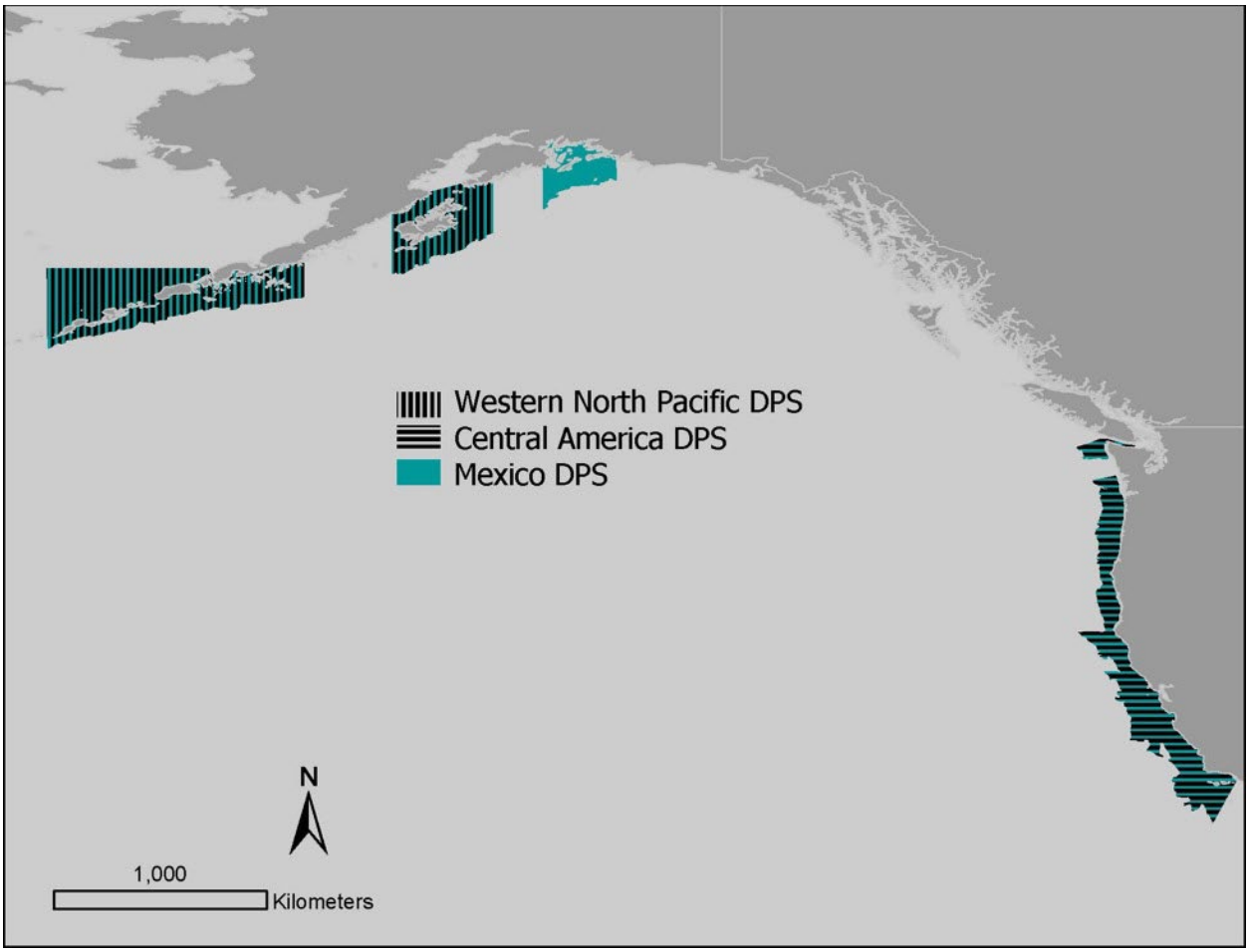
Based on the most reliable model, the best hearing range for humpback whales is expected to be between 15 Hz and 3 kHz with best sensitivity at or near 1 kHz (Tubelli *et al.* 2018).

E.2.6 Critical Habitat

In 2021, NMFS designated (86 FR 21082), then revised (86 FR 41668) critical habitat for three ESA-listed DPSs of humpback whales (86 FR 21082): the endangered Western North Pacific DPS, the threatened Mexico DPS, and the endangered Central America DPS (Figure E-2). Specific areas designated as critical habitat for the Central America DPS of humpback whales contain approximately 48,521 nmi^2 of marine habitat in the North Pacific Ocean within the portions of the California Current Ecosystem off the coasts of Washington, Oregon, and California. As shown in Figure E-2, there is no designated critical habitat for humpback whales in Cook Inlet.

The final rule (86 FR 21082) describes access to adequate prey as the only essential physical or biological feature of humpback whale critical habitat. NMFS considered and evaluated various biological and physical features of humpback whale habitat in addition to access to prey such as migratory corridors and soundscape but determined that the best available scientific information does not currently support recognizing any additional essential features

Figure E-2. Humpback Whale Critical Habitat



Source: https://www.fisheries.noaa.gov/resource/map/humpback-whale-critical-habitat-maps-and-gis-data
Accessed January 11, 2024

E.3 Fin Whales

Fin whales are sexually dimorphic. Females are about 10-15% longer than males; in the Northern Hemisphere female length is about 22.5 m and males are about 21 m (Aguillar 2009). Fin whales are slender with a narrow rostrum, and have a falcate fin located at 75% of total length. The whale's ventral grooves are numerous and extend from the chin to the umbilicus. Pigmentation of the head is strikingly asymmetrical; the left side, dorsal and ventral, is dark slate, the right side dorsal is light gray, and the right ventral is white. The pigmentation also is shown in the baleen plates, which are gray and yellowish.

E.3.1 Distribution, Local Movements and Occurrence Near Point Woronzof

Fin whales occur throughout the North Pacific, from the northeastern Chukchi Sea south (Crance *et al.* 2015). They are regularly observed in coastal waters of the Gulf of Alaska during summer months (Stafford *et al.* 2007). Surveys in the Gulf of Alaska recorded 171 and 38 sightings of fin whales in 2013 and 2015, respectively (Muto *et al.* 2022).

In May 2016, one fin whale was sighted in lower Cook Inlet between Anchor Point and Homer during beluga whales surveys (Shelden *et al.* 2017). Castellote *et al.* (2020b) reported acoustic detections of fin whales in lower Cook Inlet during seismic surveys conducted in 2019. Eight sightings of 23 fin whales were recorded in lower Cook Inlet during a seismic survey in the autumn of 2019 (Fairweather Science 2020). These areas are more than 250 km from the action area in upper Cook Inlet. No fin whales were observed during a pipeline replacement project in middle Cook Inlet in 2018 (Sitkiewicz *et al.* 2018). Based on these observations fin whales are not expected to be commonly observed north of Anchor Point but may be a very rare visitor to middle Cook Inlet waters. They are not expected to be encountered in the immediate vicinity of the action area near Point Woronzof.

E.3.2 Abundance and Trends

There are no reliable estimates of historical or current abundance for the entire Northeast Pacific stock of fin whales because the geographic coverage of surveys has been limited relative to the range of the stock (Young *et al.* 2023). In addition, any estimates have not been corrected for animals missed on the trackline, animals submerged when the ship passed, and responsive movement away from or towards the survey vessel. However, Young *et al.* (2023) provide a provisional estimate for the Northeast Pacific stock of 3,168 (CV = 0.26) fin whales from a 2013 survey. Due uncertainties about the population structure of fin whales in northeast Pacific waters and the limited geographic coverage of surveys, population trends for this stock are not appropriate to extrapolate to broader ranges and PBR is undetermined (Young *et al.* 2023).

E.3.3 Status and Risks

Fin whales were listed as threatened under the ESA in 1970 (35 FR 18319). The most recent 5-year species status review for fin whales was completed in 2019. The review concluded that the fin whale should be down-listed from endangered to threatened and recommend that NMFS commence rulemaking in the future to reclassify (NMFS 2019c).

Fin whales are at risk of mortality or serious injury from vessel strikes and encounters with commercial fishing gear. Freed *et al.* (2023) documented two ship strikes of fin whales over the period 2017-2023. One resulted in serious injury and one resulted in a mortality. In addition, during the same period, one fine whale was caught and killed during and encounter with a commercial pollock trawl net in the Bering Sea.

E.3.4 Prey and Foraging

Fin whales feed on planktonic crustaceans, including *Thysanoessa* sp. and *Calanus* sp., as well as schooling fish including herring, capelin, and mackerel (Aguillar 2009). Goldbogen *et al.* (2006) reported that fin whales in California made foraging dives to a maximum of 228-271 m and dive durations of 6.2-7.0 min. Fin whale dives likely coincide with the diel migration of krill.

E.3.5 Acoustics

While hearing studies on mysticetes such as fin whales are primarily based on anatomical research of their skulls, these species are presumed to have an auditory sensitivity in the range of 17 Hz to 35 kHz (Cranford and Krysl 2015).

E.3.6 Critical Habitat

Critical habitat has not been designated for fin whales.

E.4 Gray Whales

The gray whale is a robust, slow-moving whale recognized by a mottled gray color with numerous light patches scattered along the body and lack of a dorsal fin (Jones and Swartz 2009). Their baleen is short (5-40 cm) and cream-white to yellow in color. Adults are 10-15 m long and weigh between 16 and 45 tons. At birth, the calves are 5 m long and weigh close to 450 kg (Jones and Swartz 2009). Both male and female gray whales reach sexual maturity when they are between five and 11 years old, with the average being eight years (Rice *et al.* 1984). Gray whales are by far the most coastal of all the great whales, and inhabit primarily inshore or shallow, offshore continental shelf waters of the North Pacific. They tend to be nomadic, highly migratory, and tolerant of climate extremes (Jones and Swartz 2009).

Genetic studies have shown that there are there are two distinct populations of gray whales: the now delisted Eastern North Pacific (ENP) stock and the endangered Western North Pacific (WNP) stock (Carretta *et al.* 2023). In 2020, gray whales were found stranded in the Twentymile River of Turnagain Arm (over 70 km from the action area) and near Anchor Point (about 180 km south of the action area); these stranded animals were considered to be part of a now closed Unusual Mortality Event (UME). According to the NMFS UME website, these whales were from the delisted ENP stock[1].

The recent 5-year status review for WNP gray whales summarized a reassessment of gray whale population structure (NMFS 2023d). As stated in the 5-year review, WNP gray whales are now considered to be individuals that spend all or part of their lives in the western North Pacific near Vietnam, China, Japan, and Korea, or in the Russian Far East. Recent satellite tagging data and photo-identification of gray whales observed in waters near Sakhalin Island, the western U.S. and Canadian coasts, and Mexico have identified 59 whales that are known to migrate between eastern and western Pacific waters to feed during the winter months (NMFS 2023d). Therefore, it is likely that all gray whales observed in upper Cook Inlet and Turnagain Arm are from the delisted ENP stock.

E.5 Sunflower Sea Stars

The sunflower sea star *Pycnopodia helianthoides* is managed by NMFS and is a candidate species for listing under the ESA. On August 18, 2021, the Center for Biological Diversity petitioned NMFS to list the sunflower sea star as threatened or endangered under the ESA (Sakashita 2021). The petition was based on risks due to the continued effects of the sea star wasting syndrome (SSWS) and climate change. On December 27, 2021, NMFS announced a 90-day finding indicating that the petitioned action might be warranted and initiated a status review of the species (86 FR 73230). The subsequent October 2022 status report agreed that SSWS and climate change represented the two major threats to *P. helianthoides* but added that several other factors also increased overall extinction risk (Lowry *et al.* 2022b). The review concluded

[1] https://www.fisheries.noaa.gov/national/marine-life-distress/2019-2023-eastern-north-pacific-gray-whale-ume-closed Accessed May 14, 2024

the species is facing a moderate risk of extinction over the foreseeable future (Lowry *et al.* 2022b).

On April 11, 2023, the sunflower sea star was proposed by NMFS for listing as threatened throughout its entire range but critical habitat was not proposed at the time (88 FR 16212). Comments on the proposed rule to list the sunflower sea star were to have been received by May 15, 2023. In May 2023, NMFS held in-person public hearings on the proposed listing in Kodiak and Petersburg, Alaska (88 FR 21600). Public comments on the proposed rule and a final ruling on the listing of this species as endangered were not available as of January 2024.

A NMFS fact sheet for the sunflower sea stars shows that they are found in lower Cook Inlet and Kachemak Bay ranging to Anchor Point, about 180 km south of the action area[2]. Lowry *et al.* (2022b) notes that sunflower sea stars occupy a wide range of benthic substrates such as mud, sand, shell, gravel, and rocky bottoms, and that they roam to search out prey. They are generally found in the low intertidal and subtidal zones to a depth of 435 m but are most common at depths less than 25 m and are rare at depths greater than 120 m. Given what is known about their preferred habitat and the local conditions at Point Woronzof (see Section 3.2), this species is not expected to occur within the action area. No sunflower sea stars were collected during the 2022, 2023 or 2024 field sampling effort near the outfall (Kinnetic Environmental Inc. 2023b, 2024c)

[2] https://www.fisheries.noaa.gov/s3/2023-04/sun-flower-sea-star-distribution-map-4.20.2023.pdf Accessed May 15, 2024

Appendix F
Sources in the Environment and Potential Effects

F.1. Introduction

A review of available peer-reviewed literature studying the potential effects from chemicals that were detected in annual monitoring samples and/or supplemental samples is presented in this appendix.

F.1.1 Metals

Zinc, copper, chromium, selenium, nickel, and aluminum are essential to marine and aquatic life, while cadmium, mercury, arsenic, and lead are considered to be nonessential metals (NMFS 2019a). Nonessential metals are often toxic even at low concentrations and essential metals can become toxic at high concentrations (NMFS 2019a). Many of these metals naturally occur in surface waters. For example, according to Eisler (1998) and citations therein, copper is plentiful in the environment and essential for the normal growth and metabolism of all living organisms. Arsenic is naturally found in the Earth's crust, and is commonly adsorbed to or coprecipitated with iron oxide minerals, adsorbed to clay minerals, and associated with sulfide minerals or organic carbon (Glass and Frenzel 2001). It is also found in some volcanic rocks. Biological components of aquatic ecosystems (phytoplankton, higher aquatic plants, and bacteria) can significantly influence transformation of components such as arsenic compounds in the environment (Linnik 2015). Overall, natural sources of metals in Cook Inlet waters include metal oxides and clay minerals, organic carbon from peat and coal, and volcanic ash from nearby volcanoes (BOEM 2016, 2021, Glass 2001). Table 3-3 depicts the concentrations of metals and total cyanide measured during the period 2019 to 2023 in AWPCF receiving water samples collect in upper Cook Inlet.

As summarized in BOEM (2021) and citations therein, studies have found no indication of heavy metal pollution in Cook Inlet waters and sediments. However, there is some evidence of elevated mercury concentrations in suspended sediments, most likely linked to riverine inputs originating naturally or from past mining and other anthropogenic activities. Mining activities in the early 1900s were extensive in lower Cook Inlet near Kachemak Bay (more than 250 kilometers south of the action area); natural erosion of the source ores or tailings in the nearshore environment may continue to introduce high levels of chromium and nickel to marine waters and sediments (BOEM 2016). Elevated levels of arsenic, copper, and nickel have been attributed to differences in local geology and large coal deposits in the region (BOEM 2021).

Several studies summarized in BOEM (2021) were conducted to determine trace metals content in bays opening into lower Cook Inlet (Apeti and Hartwell 2015, Hartwell et al. 2019, Hartwell et al. 2018). Waters sampled in Chrome and Dogfish bays had higher concentrations of nickel and cadmium as compared to other locations in southcentral Alaska, as did Homer Harbor. However, these locations are more than 250 kilometers from the AWPCF outfall and were influenced by past mining or harbor operations.

In a wider ranging study, Trefry et al. (2012) noted that concentrations of dissolved metals in water samples from Cook Inlet were detected at µg/L levels. Average dissolved metal concentrations across Cook Inlet were 1.08 ± 0.12 µg/L for arsenic, 0.11± 0.02 µg/L for chromium, 0.65 ± 0.11 µg/L for copper, and 23 ± 5 µg/L for lead. Dissolved lead concentrations

were elevated at a few sites in the Trading Bay area, located approximately 86 kilometers southwest of Point Woronzof; the elevated levels were most likely caused by input from area rivers (Trefry et al. 2012).

The risk assessment and these studies support a conclusion that metal concentrations in the effluent pose no overall threat in the action area. Nonetheless, the following discussion is provided as additional background on the potential effects of metals exposure to aquatic organisms.

Aquatic organisms in Cook Inlet can be exposed to metals by direct uptake via the gills or skin, and by consumption of metals in water, sediments, and prey (NMFS 2019a). Bioaccumulation is the buildup of contaminants in an organism, whereas biomagnification is the increasing concentration up the food chain.[1] Most metals bioaccumulate but do not biomagnify, except for mercury (Burger 2008, Cardwell et al. 2013). For example, cadmium, copper, lead, and zinc generally do not biomagnify in food chains consisting of primary producers, macroinvertebrate consumers, and fish (Cardwell et al. 2013).

Research on St. Lawrence estuary beluga whales showed that high concentrations of mercury and cadmium negatively impacted immune cell production (splenocytes and thymocytes) in vitro (DeGuise et al. 1996). These are types of white blood cells that play a crucial role in mammalian immune response systems.[2, 3] The authors observed significantly decreased splenocyte and thymocyte production ($p < 0.01$) at the highest concentrations of mercury chloride and cadmium chloride (10-5 molarity [M]), while lower concentrations of these metals (10-6 and 10-7 M) as well as several different concentrations of lead chloride (10-4, 10-5, and 10-6 M) did not significantly influence immune cell proliferation (DeGuise et al. 1996).

Research presented in Kennedy et al. (2021) and citations therein, indicates that mercury persists and accumulates in marine food chains, particularly affecting top predators such as fish-eating mammals. These animals, including beluga whales, can experience adverse health effects such as immune system suppression from this mercury buildup, along with the accumulation of other metals such as silver and cadmium in their livers, a consequence of their diet and longevity (Desforges et al. 2017, Ikemoto et al. 2004, Kennedy et al. 2021).

A study comparing different Alaskan beluga whale populations found that Cook Inlet belugas generally had lower concentrations of several heavy metals (cadmium, mercury, selenium, vanadium, and silver), though copper levels were higher in this group and similar to those reported for belugas from Hudson Bay (Becker et al. 2000). While total mercury was lower in Cook Inlet belugas, methylmercury levels, the more toxic form, were comparable to other Alaskan beluga populations. Hepatic methylmercury levels did not exceed 2.11 mg/kg wet mass and were similar to other beluga stocks (Becker et al. 2000, Becker et al. 2001). As has been reported for the Point Hope and Point Lay belugas, hepatic concentrations of silver were

[1] https://cimi.org/blog/bioaccumulation-and-biomagnification-increasingly-concentrated-problems/ Accessed September 19, 2024

[2] https://www.sciencedirect.com/topics/neuroscience/splenocyte Accessed October 1, 2024

[3] https://www.cancer.gov/publications/dictionaries/cancer-terms/def/thymocyte Accessed October 1, 2024

relatively high in the Cook Inlet animals and positively correlated with mercury and selenium concentrations in the liver (Becker et al. 2000).

Studies in the Aleutian Islands and Chiswell Island investigated mercury levels in Steller sea lion pups. Elevated mercury concentrations were found in a portion of the pups' blood and hair samples, exceeding levels considered potentially harmful (> 0.2 μg/g for whole blood and 20 μg/g for hair)(Lian et al. 2020). Researchers explored the possibility that high mercury could affect selenium availability, which is crucial for immune function. However, one study on Chiswell Island4 pups (n = 19) suggested that immune protein levels were not directly affected by potential prenatal mercury exposure (range 30 to 60 μg/L)(Kennedy et al. 2021).

A 2003 study by Barwick and Maher (2003) investigated the biomagnification of trace metals in an Australian estuary near Newcastle. Their research identified selenium as biomagnifying in carnivorous fish. Arsenic showed some biomagnification in certain crustaceans, while arsenic levels in carnivorous fish mirrored their invertebrate prey. Importantly, the study found no evidence of biomagnification for copper, cadmium, zinc, or lead within the examined food web. Elevated copper in some crustaceans was linked to its biological necessity.

Studies have examined heavy metal accumulation in stranded killer whales in Japan (n = 9, including three calves) that found mercury and cadmium increased with age ($p<0.05$), suggesting limited maternal transfer (Endo et al. 2007). For example, iron concentrations in muscle tissues collected from the stranded whales were significantly lower ($p<0.05$) in the calves as compared to muscle tissue samples from mature whales. Another study by Lavery et al. (2008) on dolphins in areas with human-introduced pollutants revealed elevated lead and mercury levels in their tissues, which were correlated to increased probability of renal damage.

Heavy metal contamination can negatively impact fish populations through various exposure routes (Evans 1987). Waterborne metals can damage gill structures, disrupting essential physiological processes like solute and water transport, and causing imbalances in blood chemistry. For example, acute exposures of rainbow trout to copper at concentrations ranging from 12.5 to 200 μg/L for 12 to 24 hours was correlated with a decline in Na^+ and Cl^- concentrations in the blood and blood ammonia levels also rose under copper treatments (Evans 1987, Laurén and McDonald 1985).

To investigate the effects of a metals-contaminated diet, Woodward et al. (1994) fed rainbow trout benthic invertebrates from the Clark Fork River in northwestern Montana that contained elevated concentrations of arsenic, cadmium, copper, and lead from mining wastes that have contaminated the river since 1880. Diet-borne metals were more important than water-borne metals, leading to liver damage and impaired waste processing (Woodward et al. 1994). In developing fish larvae, copper can affect survival and growth (NMFS 2007). Exposure to elevated copper concentrations can hinder the survival and growth of young fish and impair their sensory systems, potentially affecting crucial behaviors like migration (Johnson et al. 2007). Sandahl et al. (2004) exposed juvenile coho salmon to copper concentrations ranging from 5–20 μg/L and observed a 20% loss of sensory function at a copper exposure of 4.4 μg/L. However, Sandahl et

[4] Located south of Resurrection Bay and Seward, Alaska.

al. (2006) determined that chum salmon can recover from 4-hour exposures of from 3 to 58 µg/L of copper concentrations within 1 day.

F.1.2 Organic Compounds

F.1.2.1 Total Aromatic Hydrocarbons (TAH)

Zinc, copper, chromium, selenium, nickel, and aluminum are essential to marine and aquatic life, while cadmium, mercury, arsenic, and lead are considered to be nonessential metals (NMFS 2019a). Nonessential metals are often toxic even at low concentrations and essential metals can become toxic at high concentrations (NMFS 2019a). Many of these metals naturally occur in surface waters. For example, according to Eisler (1998) and citations therein, copper is plentiful in the environment and essential for the normal growth and metabolism of all living organisms. Arsenic is naturally found in the Earth's crust, and is commonly adsorbed to or coprecipitated with iron oxide minerals, adsorbed to clay minerals, and associated with sulfide minerals or organic carbon (Glass and Frenzel 2001). It is also found in some volcanic rocks. Biological components of aquatic ecosystems (phytoplankton, higher aquatic plants, and bacteria) can significantly influence transformation of components such as arsenic compounds in the environment (Linnik 2015). Overall, natural sources of metals in Cook Inlet waters include metal oxides and clay minerals, organic carbon from peat and coal, and volcanic ash from nearby volcanoes (BOEM 2016, 2021, Glass 2001). Table 3-3 depicts the concentrations of metals and total cyanide measured during the period 2019 to 2023 in AWPCF receiving water samples collect in upper Cook Inlet.

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southwest of Point Woronzof; the elevated levels were most likely caused by input from area rivers (Trefry et al. 2012).

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[5] https://cimi.org/blog/bioaccumulation-and-biomagnification-increasingly-concentrated-problems/ Accessed September 19, 2024

[6] https://www.sciencedirect.com/topics/neuroscience/splenocyte Accessed October 1, 2024

[7] https://www.cancer.gov/publications/dictionaries/cancer-terms/def/thymocyte Accessed October 1, 2024

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[8] Located south of Resurrection Bay and Seward, Alaska.

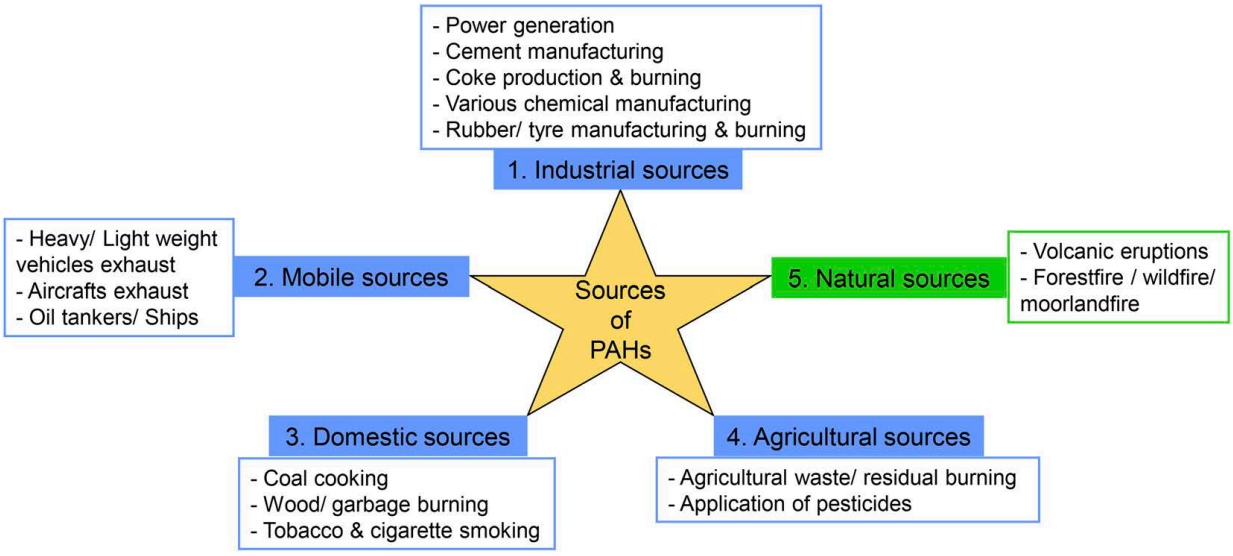
F.1.2.2 Polycyclic Aromatic Hydrocarbons

found in petroleum (NMFS 2019a, Patel et al. 2020). Compared to BTEX compounds, PAHs are less likely to evaporate or dissolve in water, leading to their accumulation in sediments for extended periods (decades)(ADEC 2015, Adeniji et al. 2019).

PAHs are categorized by their molecular weight, with lighter compounds existing as gases and heavier compounds as solids. While various environmental processes such as dilution, volatilization, photolysis, and biodegradation can break down PAHs (Patel et al. 2020), heavier PAHs tend to persist longer because of their larger size and other chemical properties such as being less volatile, relatively insoluble in water, and more lipophilic than the low molecular weight (LMW) PAHS (Adeniji et al. 2019).

Figure 6-1 shows the anthropogenic (blue) and natural (green) sources of PAHs in the environment.

Figure 6-1. Sources of PAHs in the Environment



Source: Patel et al. (2020)

PAHs, when entering marine environments, dissolve and adhere to particles and sediments, subsequently being ingested or absorbed by marine life (that is, through the gills) (Lourenço et al. 2016). Sediments act as a reservoir for PAHs, with high molecular weight (HMW) PAHs being less soluble and more persistent than their LMW counterparts, potentially affecting bottom-dwelling organisms (Eisler 1987). Multiple studies have investigated the presence of polycyclic aromatic hydrocarbons (PAHs) in Alaska's Cook Inlet. The EPA (2003) identified oil and gas activities as potential sources, and ICIEMAP research detected low PAH levels with localized human contributions in sediments (Savoie et al. 2012). Sediment samples from beluga feeding areas showed lower PAH concentrations compared to urban locations Wetzel et al. (2010).

While many aquatic species can rapidly accumulate PAHs, this process varies greatly depending on the species and the specific chemical. Vertebrates possess a greater capacity to metabolize and excrete PAHs compared to invertebrates, preventing significant biomagnification in most

food chains (Broman et al. 1990, Lourenço et al. 2016, Meador et al. 1995, Takeuchi et al. 2009, Wan et al. 2007). Based on their lithophilic nature some species of bivalves have been shown to bioaccumulate HMW PAHs (Bleeker and Verbruggen 2010, Eisler 1987, Johnson et al. 2008).

Bioaccumulation of PAHs is generally not significant for most fish species because fish are capable of transforming PAHs into compounds that are soluble in water, which facilitates elimination (Bleeker and Verbruggen 2010). However, immune dysfunction as a result of PAH exposure has been recorded in juvenile salmonids (Yanagida et al. 2012). Yanagida et al. (2012) monitored PAH exposure in out-migrating juvenile Chinook salmon from the Lower Columbia River. The authors determined that concentrations of PAHs in sediment samples collected from five sites in the Lower Columbia River and one site from the Willamette River near Portland were relatively low with average total PAH concentrations of < 1,000 nanograms per gram (ng/g) dry weight. However, PAHs detected in salmon stomach contents from all sites ranged from < 100 to > 10,000 ng/g wet weight. Metabolites of LMW and HMW PAHs were also detected in bile samples collected from salmon at all sites (Yanagida et al. 2012).

Studies reported in Beland et al. (1993), DeGuise et al. (1995), Martineau et al. (1994), Martineau et al. (1988), McKinney et al. (2006), Poirier et al. (2019), Simond et al. (2020) suggest a potential link between environmental pollutants and health issues in beluga whales, particularly those in the St. Lawrence Estuary. Research analyzing beluga DNA found significantly elevated levels of PAH-DNA adducts in St. Lawrence (n = 51) and Cook Inlet (n = 4) populations compared to Arctic belugas (n = 20), suggesting potential causality from PAH exposure and cancer (p = 0.003 and 0.02, respectively). This DNA damage in St. Lawrence belugas supports the hypothesis that PAH exposure contributes to the high cancer rates observed in this group. While sediment samples from feeding areas showed lower PAH levels than urban sites, PAHs were detected in beluga tissues and in prey like Chinook salmon, indicating a route of exposure.

Concentrations of total PAHs in archived Cook Inlet beluga blubber and liver samples, including fluorenes, anthracenes, and phenanthrenes, were the most dominant PAHs found in liver tissues, while blubber samples contained napthalenes, fluorenes, anthracenes, and fluoranthracenes (Wetzel et al. 2010). While Wetzel et al. (2010) noted the detection of PAHs in salmon, hooligan, and saffron cod collected from upper Cook Inlet sites in Eagle Bay, near the Port of Anchorage/Ship Creek, and at the mouths of the Big and Little Susitna Rivers, the levels in whole fish were considered unremarkable.

Saupe et al. (2014) measured concentrations of 49 different PAH compounds in tissues of potential Cook Inlet beluga winter prey species from sampling stations located in lower Cook Inlet, at stations north of the Forelands near, and across from Trading Bay. Nondetectable levels of PAHs in winter beluga prey species such as eulachon, snailfish, sand shrimp, Dover sole, Pacific cod, tomcod, and starry flounder were reported (Saupe et al. 2014).

F.1.2.3 Persistent Organochlorine Pollutants

Persistent organochlorine pollutants (POPs) include but are not limited to PCBs, chlorinated pesticides, herbicides, dioxins, and furans. The three main sources of POPs in the environment are agriculture, industrial activities, and municipal populations (Adithya et al. 2021). Combustion processes for industry and municipalities such as those used to generate power, industrial

boilers, furnaces, incinerators, and home heating equipment produce POPs. Full-scale combustion facilities like power plants can be significant POP generators because of the massive amounts of flue gas released during combustion (Mandal et al. 2024). Total POP emissions from small combustion appliances like wood stoves and home oil furnaces can also be significant based on the large numbers of units installed close to inhabited areas (Adithya et al. 2021, Lee et al. 1998).

POPs are characterized by their long-lasting presence in the environment, toxicity, capacity to accumulate in living organisms, and ability to spread across great distances (Mandal et al. 2024). Due to these properties, POPs can be found globally (Fitzgerald and Wikoff 2014). POPs are semi-volatile and easily absorb into airborne or waterborne particulate matter, which can then enter streams and waterbodies (Liu et al. 2023c). Because POPs have limited solubility in water, they are able to tightly bind to aquatic sediments (Mandal et al. 2024). However, POPs exhibit high lipid solubility, which allows them to bioaccumulate in fatty tissues of living beings (Fitzgerald and Wikoff 2014).

Becker et al. (2000) measured concentrations of PCBs, chlorinated pesticides, chlordane compounds, HCB, dieldrin, Mirex, toxaphene, and HCH in tissues from Cook Inlet beluga whales. POPs measured in Cook Inlet beluga blubber were compared with those reported for belugas from two Arctic Alaska locations (Point Hope and Point Lay), Greenland, Arctic Canada, and the highly contaminated stock from the St. Lawrence estuary.

Total PCB and DDT concentrations measured in the Arctic and Cook Inlet belugas were an order of magnitude lower than those found in belugas from the St. Lawrence estuary. The lowest concentrations of all POPs were detected in Cook Inlet belugas (Becker et al. 2000, Becker et al. 2001). PCBs averaged 1.49 ± 0.70 mg/kg wet mass in males and 0.79 ± 0.56 mg/kg wet mass in females. DDT concentrations averaged 1.35 ± 0.73 and 0.59 ± 0.45 mg/kg in males and females, respectively. Concentrations of these chemicals in the blubber of the Cook Inlet males were approximately half of those found in males from the Arctic population. The comparison of concentrations of POPs in samples collected from a female and from her near-term fetus indicated that all substances measured in the tissues were transferred from the mother to the fetus (Becker et al. 2000, Becker et al. 2001). At the time of the publication, the authors summarized that because of the lower concentrations of POPs in Cook Inlet beluga whales, the effects of PCBs and chlorinated pesticides on animal health may be of less significance for the Cook Inlet animals than for the other beluga whale stocks (Becker et al. 2001).

Hoguet et al. (2013) assessed temporal contaminant trends in the Arctic to determine whether restrictions on legacy POPs have led to concentration declines. Between 1989 and 2006, tissue samples were collected from two subpopulations of beluga whales: Cook Inlet and the eastern Chukchi Sea. Several POPs including PCBs, DDT, chlordanes, HCHs, chlorobenzenes, mirex, PBDEs, and HBCDs were measured in 70 blubber samples. Legacy POPs (PCBs, chlordanes, DDTs, and HCHs) predominated in tissues from both subpopulations. Statistical analyses showed that at least one of the four independent variables (subpopulation, sampling year, sex, and animal length) influenced the POP concentrations. PCBs, DDTs, chlordanes, chlorobenzenes, and mirex, were significantly higher in belugas from the eastern Chukchi Sea. Total PBDE and alpha-HBCD concentrations were significantly higher in Cook Inlet belugas. Sex and length also

significantly influenced some concentrations. All other POP concentrations were stable (Hoguet et al. 2013).

Burek-Huntington et al. (2022a) conducted a retrospective analysis of samples collected from Cook Inlet beluga whales that had been harvested for subsistence during the period 1989 to 2005. The authors considered data from prey items in stomach contents, and contaminant analyses in tissues from ovaries and testes, blubber, and liver. POPs, PFAS, total mercury, and pathology including gross and histologic findings were analyzed. Mirex (a POP) and mercury showed "…a significant increase in concentration with body length and no detectable difference between sexes" (*p* value not reported). Other POP concentrations were significantly higher (*p* value not reported) in males than in females. Concentrations were also higher in females that were pregnant versus lactating. PBDE and HBCD (flame retardants) significantly increased from 1995 to 2005 in tissues collected from both sexes. Overall, levels were higher in Cook Inlet beluga tissues as compared to other Alaska beluga populations.

In their conclusions, Burek-Huntington et al. (2022a) note that the histopathology of harvested Cook Inlet belugas does not greatly differ from other beluga populations. The authors concluded that while it appears that the presence of flame retardants in beluga tissues have increased over time, the effects of the levels detected on fecundity and fetal development are unclear. The cause for the current lack of recovery for the Cook Inlet beluga whale population cannot be determined based on these findings (Burek-Huntington et al. 2022a).

Although they did not sample Cook Inlet beluga whales, Noël et al. (2014) collected blubber samples from 43 male beluga whales harvested in the Beaufort Sea during the period 2008 to 2010 to evaluate the effects of POPs on the levels of 13 beluga health-related gene transcripts. Consistent with their role in detoxification, hydrocarbon receptors and cytochrome transcripts were positively correlated with concentrations of PCBs, the dominant POP in these belugas. Analyses distinguished between these two toxicology genes and 11 other genes primarily involved in growth, metabolism, and development. The authors state that their results provide insight into the presence of legacy of PCBs in a remote environment, and on the possible health impacts to beluga whales (Noël et al. 2014).

In a subsequent study, Noël et al. (2018) assessed temporal trends of legacy POPs in eastern Beaufort Sea beluga blubber. Concentrations of PCBs and 14 pesticides were quantified in 185 blubber samples collected between 1989 and 2015. The concretions of most legacy POPs analyzed (PCBs, chlordanes, dichlorodiphenyltrichloroethane, HCB, dieldrin, and Mirex) in blubber showed no significant changes during the study period and did not reflect regulations put into place during the past decades to reduce or eliminate use of these POPs. Although α-HCH (82.6 ± 12.6 and 15.9 ± 1.9 ng/g in 1989 and 2015, respectively) and γ-HCH (126.6 ± 23.9 and 13.9 ± 0.9 ng/g, 1989 and 2015, respectively) showed significant decrease over this period, β-HCH showed a more complex trend with concentrations increasing between 1989 (71.2 ± 13.4 ng/g) and 2004 (276.8 ± 13.5 ng/g) before decreasing until 2015 (174.7 ± 8.3 ng/g).

Using the same data set from Beaufort Sea whales, Crichton (2020) also found some evidence that POPs may be influencing individual gene expression in Arctic belugas and noted subtle indicators pointing to a potential interaction between climate change and contaminants in the blubber of these whales. The highest concentrations of PCBs and PBDEs were detected in the

samples in 2014, a period of high sea ice extent; however, in other years, there were no similar correlations. The author concludes that neither contaminant concentrations in blubber nor observed signs of climate change were able to fully explain all of the variations observed in whale gene expression alone, so it is possible that the two factors may interact in some way to exacerbate effects (Crichton 2020).

Two studies investigated POPs in Canadian beluga whale populations. McKinney et al. (2006) found significantly higher concentrations of PCBs, DDT, and PBDEs in St. Lawrence estuary belugas compared to those from western Hudson Bay. Their analysis suggested that PBDEs were directly accumulated from the environment, while PCBs were metabolized within the whales. Wilson et al. (2005) examined protein expression related to detoxification and observed high levels in St. Lawrence belugas, which also had the highest PCB concentrations among cetaceans. These researchers proposed a link between this protein activity, driven by high pollutant levels, and the development of lesions in the St. Lawrence beluga population.

A 2021 study by Krasnova et al. (2021) investigated the presence of specific pollutants in beluga whales inhabiting Russian Arctic waters. The research involved analyzing tissue samples from 22 whales across the White, Kara, and Bering Seas between 2012 and 2017. DDE, a persistent organic pollutant, was the most prevalent compound identified. Belugas from the White Sea exhibited the highest levels of DDE, while those from the Bering Sea's Anadyr estuary showed the lowest. The researchers determined that factors such as the whales' biology, how these pollutants move through the environment, and the extent of regional pollution contributed to the varying pollutant levels observed across different locations.

A study examining POPs in more than 1,000 stranded marine mammals off Great Britain between 1990 and 2018 found varying concentrations across eleven species, though PCBs, DDTs, and PBDEs were generally most prevalent (Williams et al. 2023a). Killer whales displayed the highest POP levels, nearly two orders of magnitude greater than gray seals, which had the lowest. While POP concentrations have decreased during the last three decades and followed consistent patterns based on age and sex (adult males having the highest), many individuals still exceeded thresholds for potential physiological and adverse effects. Williams et al. (2023a) highlights that despite the decline, POPs remain a concern for marine mammal health because of considerable variation in concentrations and their rates of reduction.

Cullon et al. (2009) investigated POP levels in Chinook salmon, a primary food source for northeastern Pacific killer whales. The research indicated that adult Chinook accumulated the vast majority (97 to 99%) of these contaminants, including PCBs and DDTs, while foraging in the ocean. Cullon et al. (2009) suggests these findings are a key reason why southern resident killer whales have significantly greater daily intakes of PCBs compared to their northern counterparts because southern residents may consume more salmon to compensate for lower fat content in their prey, potentially exacerbating their POP exposure.

Formigaro et al. (2014) determined the levels of 19 organochlorine pesticides and 18 PCBs in the plasma of captive adult killer whales and in their prey. These lipophilic contaminants concentrate in the whales' blubber (Desforges et al. 2017, Jepson and Law 2016), with levels influenced by factors like diet, age, and sex (Formigaro et al. 2014). Higher POP concentrations correlated with lower prey availability (Lundin et al. 2016), suggesting nutritional stress exacerbates bioaccumulation. While transfer of POPs occurs from mothers to offspring during

lactation, Lundin et al. (2016) found no direct link between POP levels and thyroid hormone disruption. Overall, the continued bioaccumulation of POPs remains a significant concern for these marine apex predators (Schlingermann et al. 2020).

F.1.3 Emerging Pollutants of Concern

F.1.3.1 Per- and Polyfluoroalkyl Substances (PFAS)

PFAS are a large group of approximately 16,000 synthetic chemicals[9] that are highly persistent in the environment because of their resistance to typical degradation processes (Gaines 2023, ITRC 2023c). The chemical and physical properties of PFAS vary widely as do their potential risks to human health and the environment (ITRC 2023c). PFAS provide oil, water, stain, and soil repellency; chemical and thermal stability; or friction reduction to many products used in the aerospace, semiconductor, medical, automotive, construction, electronics, and aviation industries, as well as to consumer products such as carpets, clothing, furniture, outdoor equipment, food packaging, and firefighting foams (ITRC 2023b). PFAS are also widely used in the textile and leather industries as waterproof membranes and surface finishes and are processing agents for dyes and bleaches and to reduce foaming in textile treatment baths (Gilchrist 2023). In one recent study, firefighting foam contamination showed the highest median concentrations for both PFOA and PFOS, while the second-highest median concentrations were associated with landfill leachates. Biotransformation products such as fluorotelomer carboxylic acids and perfluoroalkyl acids were detected in landfill leachates and WWTP effluents (Dasu et al. 2022). Despite the production phaseout, legacy firefighting foams remain a primary source of PFAS contamination because of their longevity and potential storage in various locations (ITRC 2023d). Widespread use of these compounds has resulted in the detection of PFAS in all environmental media globally, indicating significant contamination (Pulster et al. 2024).

AWPCF samples at the outfall indicate very low levels of total PFAS (Kinnetic Environmental Inc. 2024b) that are not expected to pose risks to ESA-listed species that may be exposed near the outfall. Nonetheless, PFAS in effluent from small municipal WWTPs elsewhere have been reported (Ahrens et al. 2009, ITRC 2023a). Standard WWTPs may not effectively eliminate PFAS, and even advanced methods may not fully remove these chemicals if not specifically designed for them (ITRC 2023d). Chen et al. (2018) found that PFAS removal rates vary significantly among WWTPs based on the treatment processes employed. Thus, despite treatment efforts, low levels of PFAS, such as PFOA, persist in WWTP effluent, leading to considerable annual discharge into the environment (Thompson et al. 2022).

Hayman et al. (2021) studied the toxicity of PFOS and PFOA to four marine species typically used in marine laboratory toxicity testing: purple sea urchin, Mediterranean mussel, opossum shrimp, and a bioluminescent dinoflagellate. For PFOS and PFOA, the range of median lethal concentrations for PFOS was 1.1 to 5.1 mg /L (1,100,000 ng/L to 5,100,000 ng/L) and for PFOA the median range was 10 to 24 mg/L (10,000,000 ng/L to 24,000,000 ng/L). The Mediterranean mussel was the most sensitive species, followed by the purple sea urchin. While screening levels and toxicity reference values have been developed for numerous individual

[9] https://www.epa.gov/comptox-tools/comptox-chemicals-dashboard-resource-hub Accessed July 11, 2024

PFAS, data gaps regarding the mode of action for toxicity of PFAS mixtures remain (Fey et al. 2022).

Simpson et al. (2021) measured the chronic toxicity of PFOS to 11 benthic estuarine/marine species. The lowest dissolved PFOS concentrations causing toxicity to bivalve growth were 0.28 mg/L, while 0.49 mg/L affected the survival and growth of juvenile amphipods. The authors concluded that PFOS represented a low overall risk to benthic organisms in estuarine/marine environments from direct toxicity and secondary poisoning. No toxicity from PFOS occurred to benthic algae, copepod, or crab species. The toxicity of PFOS to amphipod survival and reproduction was attributed to dissolved concentrations rather than dietary exposure. The most highly PFAS-contaminated field-collected sediment had 0.18 mg/kg PFOS, which resulted in 0.0014 mg/L PFOS in the overlying waters during the tests (Simpson et al. 2021).

PFAS can accumulate in biota and biomagnify in higher trophic levels throughout the food web (ITRC 2023d). Relatively low concentrations are seen in tissue samples from invertebrates and fish, while higher levels are observed in seals, seabirds, and polar bears (ITRC 2023d). Lee et al. (2023) found that PFAS were the most prevalent compounds in skeletal muscle and liver samples of northeastern Pacific killer whales. Trophic transfer of PFAS and biomagnification seem more prevalent in air-breathing organisms (aquatic-dependent birds and mammals) than in gill-breathing species (higher trophic-level fishes). It is presumed that elimination of PFAS via gills to water is much greater than elimination from lungs to air (De Silva et al. 2021). Research by Martin et al. (2003) showed that rainbow trout assimilated PFAS from their food at an efficiency rate of more than 50% but that bioaccumulation factors in juvenile trout were not statically greater than 1, suggesting that dietary exposure will not result in biomagnification in juvenile rainbow trout (Martin et al. 2003).

PFOA and PFOS, which are long-chain PFAS (ITRC 2023d), have been shown in studies to negatively affect reproductive health in mammals (Gonsioroski et al. 2020). Thresholds for health effects of PFAS in marine mammals are not established but PFAS levels have been linked to estrogenic, reproductive, and endocrine effects in wildlife (Andvik et al. 2021, Reiner and DeWitt 2015). Endocrine disruption occurs either by interacting with hormone receptors or by altering hormone synthesis or metabolism, causing observable adverse effects (Matthiessen et al. 2018).

Burek-Huntington et al. (2022a) analyzed blubber and liver samples from 27 Cook Inlet beluga whales (13 males and 14 females, including 4 pregnant and 4 lactating) for PFAS. Total PFAS concentrations were higher for Cook Inlet beluga males as compared to females. However, for female Cook Inlet belugas, concentrations were higher for those lactating than pregnant. Burek-Huntington et al. (2022a) also determined that PFOS was the dominant PFAS measured in Cook Inlet belugas at a median concentration of 22.0 ng/g.

Perfluorinated carboxylic (PFCA) and sulfonic (PFSA) acids as well as the PFOS precursor perfluorooctane sulfonamide (PFOSA), were measured in livers of 68 beluga whales collected from the Cook Inlet and eastern Chukchi Sea subpopulations from 1989 to 2006 (Reiner et al. 2011). PFOS and PFOSA were the dominant compounds measured in both subpopulations, with overall median concentrations of 10.8 ng/g and 22.8 ng/g, respectively. Long-chain (9 to 14 carbons) PFCAs, were detected in more than 80% of the samples. Perfluoroundecanoic acid (PFUnA) and perfluorotridecanoic acid (PFTriA) made up a large percentage of the PFCAs

measured with median concentrations of 8.49 ng/g and 4.38 ng/g, respectively. Cook Inlet beluga whales exhibited higher concentrations of most PFCAs and PFOS ($p < 0.05$); however, they also had a lower median concentration of PFOSA when compared to belugas from the eastern Chukchi Sea ($p < 0.05$). Temporal trends indicated most PFCAs, PFHxS, PFOS, and PFOSA concentrations increased from 1989 to 2006 ($p < 0.05$). Observations suggested that the accumulation of PFCs in belugas is influenced by year, location, sex, and length.

F.1.3.2 Nonylphenols and Nonylphenol Ethoxylates'

NP/NPEs are common nonionic surfactants with a detergent-like function. Characterized as thick, yellow liquids, they do not dissolve in water but readily mix with various organic compounds.[10] These substances find extensive application in numerous industrial activities and consumer goods, including cleaning agents and paints. Consequently, their widespread use has resulted in substantial environmental discharge into aquatic ecosystems (EPA 2024c). NP/NPEs are endocrine-disrupting chemicals that can adversely impact hormonal controls, sexual differentiation, reproductive success, and community structure of aquatic organisms (Hong et al. 2022). Because they are amphiphilic, these compounds can accumulate in sediments and biological sewage sludges (Uysal 2017). Uysal (2017) noted that NP/NPEs can be removed by several wastewater treatment methods such as aerobic, anaerobic, UV, ozonation, activated carbon and aerobic composting.

Meador et al. (2016) evaluated the presence and concentration of contaminants of emerging concern from three estuaries within Puget Sound. The authors analyzed effluent from two WWTPs and their receiving waters and conducted whole-body tissue analyses of juvenile Chinook salmon and Pacific staghorn sculpin captured in estuaries receiving effluent. They analyzed the samples for 150 compounds including pharmaceuticals, personal care products, and industrial compounds including nonylphenol (NP), which was detected in water and tissue samples at a level thought to cause adverse effects in fish (Meador et al. 2016). NP was one of the most pervasive compounds in the study; it was observed in all but one sample at relatively high concentrations in water (14 to 41 ng/L) and tissues (8 to 76 ng/g). Ethoxylates of nonylphenol (NPE) were also detected in most effluent and tissue samples. Concentrations of NP and bisphenol A in fish tissues from juveniles collected from the Voight's Creek Hatchery were as high or higher than levels found in estuary fish and may have come from leaky septic systems in the area or other discharge upstream (Meador et al. 2016).

Ruczyńska et al. (2020) analyzed concentrations NP/NPEs in Baltic Sea fish tissues (flounder, cod, and eel), with higher levels in the liver compared to muscle. The mean concentration of NPs in the liver of flounder caught in the Gulf of Gdańsk was 222 μg kg-1 wet weight, while in that of the eel ranged from 57 μg kg-1 ww to 519 μg kg-1 wet weight. Concentrations in muscles were low in ranging from 14.2 to 28.2 μg-1 kg wet weight (Ruczyńska et al. 2020).

Lee et al. (2023) quantified several EPOCs in skeletal muscle and liver samples of transient killer whales in the northeastern Pacific and investigated in utero transfer of these contaminants. The authors stated that maternal transfer ratios indicated 4-nonyphenol (4-NP) as the most

[10] https://pubchem.ncbi.nlm.nih.gov/compound/25154-52-3 Accessed July 29, 2024

transferred contaminant from the mother to the fetus, with maternal transfer rates as high as 95.1% for this compound.

Research by Keith et al. (2001) and Kannan et al. (2003) evaluated concentrations of NP/NPEs in fish inhabiting various waters in Michigan. NPEs were detectable in some samples, but at concentrations less than the method detection limit (16.8 ng/g). Of 183 fish tissues analyzed from the Kalamazoo River, 59% had no detectable NP or NPE.

F.1.3.3 6-PDD Quinone

The compound 6-PPD is added to vehicle tires to inhibit the breakdown of rubber from exposure to oxygen and ozone; when 6-PPD reacts with ozone, it forms 6PPD and 6-PPD quinone.[11] As tires wear down through contact with roads, particles containing 6-PPD quinone are released. When on the roads and in the atmosphere, dust and particles containing 6-PPD quinone can enter streams and other water bodies through stormwater runoff pathways.[12] Globally, approximately 3.1 billion tires are produced annually, resulting in an average 0.81 kilograms per capita annual emission rate of tire rubber particles (Sieber et al. 2020). When the dust or particles reach streams or waterbodies, 6-PPD quinone is released to the water column and fish and other organisms can be exposed. Multiple studies indicate that tire wear particles, specifically the toxic transformation product 6PPD-quinone, are entering WWTPs through stormwater runoff and commercial activities (Challis et al. 2021, Jiao et al. 2024, Johannessen and Metcalfe 2022, Seiwert et al. 2022). Research in Canada and Germany detected 6PPD-quinone in both the influent and effluent of WWTPs, suggesting incomplete removal during the treatment process (Johannessen and Metcalfe 2022), especially during snowmelt and rainfall events, which increase the pollutant load (Seiwert et al. 2022). Further investigation into the fate of 6PPD-quinone during disinfection revealed that it reacts with common disinfectants, forming new transformation products that may exhibit even greater ecotoxicity to aquatic life like zebrafish embryos (Jiao et al. 2024). These findings underscore the need to reduce 6PPD-quinone concentrations before water disinfection to mitigate potential environmental harm.

Coho salmon are particularly sensitive to exposure to 6-PPD quinone and current research shows other fish such as brook and rainbow trout can also be affected (Lo et al. 2023a). Tian et al. (2021) found that in laboratory tests, 20 µg/L of leachate-derived 6-PPD quinone rapidly induced mortality in juvenile coho salmon; mortality occurred less than 5 hours after exposure and initial symptoms were evident within 90 minutes. Controlled dosing experiments (10 concentrations, n = 160 fish) showed that 6PPD-quinone was highly toxic (LC50 of 0.79 ± 0.16 µg/L) to juvenile coho salmon (Tian et al. 2021). Samples from stormwater-affected creeks of the U.S. West Coast indicated widespread occurrence of 6-PPD quinone at concentrations of <0.3 to 19 µg/L; median lethal concentrations toxic to juvenile coho in this study were 0.8 ± 0.16 µg/L. 6-PPD quinone is likely the primary toxicant implicated in observed stormwater-linked coho salmon acute mortality events (Tian et al. 2021).

McIntyre et al. (2021) investigated the impact of roadway runoff and tire wear particle leachate on adult salmon. Research specifically aimed to determine if the previously identified lethal

[11] https://www.epa.gov/chemical-research/6ppd-quinone Accessed July 30, 2024

[12] https://www.usgs.gov/programs/environmental-health-program/science/6ppd-quinone Accessed July 21, 2024

effects of 6-PPD quinone on juvenile coho (Tian et al. 2021) also applied to adult coho exposed to realistic runoff conditions. The study revealed that adult coho salmon exhibited signs of cardiorespiratory distress and death when exposed to both roadway runoff and tire leachate. The lowest concentration of leachate (100 mg/L) killed 25 to 50% of adult coho salmon during 24 hours of exposure (McIntyre et al. 2021). There were no survivors in the intermediate (320 mg/L) or high (1,000 mg/L) tire wear particle leachate treatments during the same period. Most mortality occurred within the first 6 hours. Notably, chum salmon did not display similar negative reactions to the same exposures. The findings indicate that tire wear particles in roadway runoff pose a significant acute threat to adult coho salmon survival at environmentally relevant concentrations.

Lo et al. (2023a) research summarized that rainbow trout, brook trout, Arctic char, white sturgeon, brown trout, Atlantic salmon, white-spotted char, southern Asian Dolly Varden, masu salmon, zebrafish, sand fleas, and amphipods were all less sensitive to 6-PPD quinone than coho salmon. Arctic char and white sturgeon 96-h LC50 values were estimated to be more than 12.7 µg/L (Brinkmann et al. 2022, Foldvik et al. 2022, Hiki et al. 2021). Brinkmann et al. (2022) determined LC50s in brook trout (24 hour) and rainbow trout (72 hour) as 0.59 and 1.00 µg/L, respectively. Mortalities in brook trout occurred between 1.2 and 20 hours, while mortalities began after 7 hours and occurred until 60 hours in rainbow trout (Brinkmann et al. 2022). Char and sturgeon showed no mortalities after exposure up to 96 hours at measured concentrations as high as 14.2 µg/L (Brinkmann et al. 2022).

F.1.3.4 Pharmaceuticals and Personal Care Products

EPA defines PPCPs as any product used by individuals for personal health or cosmetic reasons. PPCPs encompass a diverse group of chemicals, including all drugs (prescription and over the counter drugs such as aspirin, acetaminophen, caffeine, and pseudoephedrine), illicit drugs such as cocaine, and non-medicinal consumer chemicals (fragrances in lotions and soaps, ultraviolet [UV] filters in sunscreens) (EPA 2024b, Jyoti and Sinha 2023). PPCPs often enter ecosystems through wastewater effluents, improper disposal, agricultural runoff, and residues from pharmaceutical manufacturing. Ingested pharmaceuticals and caffeine are often incompletely metabolized in the human body and the unmetabolized portion is excreted in urine or feces and discharged in domestic sewage (NMFS 2019a). Tarpani and Azapagic (2018) stated the main pathway for the discharge of PPCPs into waterways is through WWTP effluent.

Meador et al. (2016) evaluated the presence and concentration of contaminants of emerging concern from three estuaries within Puget Sound. Pharmaceuticals such as sertraline, triclosan, fluoxetine, and metformin, were detected in water and tissue at concentrations that the authors theorize may cause adverse effects in fish (Meador et al. 2016). In addition, 29 PPCPs were detected in effluent and fish tissue, but not in estuarine waters, indicating that bioaccumulation of some compounds had occurred. While these pharmaceuticals tend to remain mostly dissolved in water, they can be bioaccumulated by organisms through ventilation, ingested water, and prey, and therefore, may interact with receptor targets resulting in pharmacological effects if concentrations are sufficiently high. Of note was the seemingly preferential bioaccumulation of EPOCs in free-ranging juvenile Chinook salmon, a preferred prey of Cook Inlet beluga whales, relative to staghorn sculpin, a benthic species with relatively high site fidelity (Meador et al. 2016).

In 2017, following the study methods in Meador et al. (2016), NMFS collected fish tissue (n = 119) and water (n = 126) samples from four locations in Cook Inlet, including Eagle Bay, Ship Creek near Anchorage, the Susitna River Delta, and Twentymile River (NMFS, unpublished). Preliminary results indicated four out of 126 analytes were detected at concentrations greater than the reporting limit (RL), including acetaminophen, benzoylecgonine (excreted in urine by cocaine users), caffeine, and the antibiotic sulfamethoxazole. Twenty-one analytes were detected in fish tissues sampled, including antibiotics, amphetamine, caffeine, fluticasone propionate (a corticosteroid), hydrocodone, ibuprofen, an antidepressant called sertraline, and Trenbolone acetate, which is a steroid used to treat livestock. NPs and PFCs (PFOA, PFNA, PFOS, and PFHxS) were also detected (NMFS, unpublished). Alsop and Wilson (2019), and citations therein, stated serotonin selective reuptake inhibitors (SSRIs; used to treat depression and other psychiatric disorders), such as sertraline and fluoxetine have been shown to affect survival, development, growth, reproduction, and behavior in mollusks, crustaceans, and fish.

Many PPCPs contain UV filters and paraben preservatives. Jyoti and Sinha (2023) reviewed 300 research articles, review articles, and guidelines published during the period 2000 to 2023 related to the effects of components of PPCPs on aquatic systems. Of the compounds reviewed, the plasticizers and UV filters were found to have the most toxic effects. These compounds continuously and persistently release biologically active and inactive components, which interfere with the physiological systems of exposed fish, corals, shrimps, bivalves, and algae (Jyoti and Sinha 2023).

PPCPs can produce endocrine-disrupting effects on marine and aquatic wildlife when they reach aquatic ecosystems via recreation activities and WWTP effluent (Brausch and Rand 2011, Fenni et al. 2022). To address potential bioaccumulation, Pintado-Herrera et al. (2024) estimated the accumulation and effects on the bivalve *Ruditapes philippinarum* of four PPCPs, including triclosan, OTNE (a fragrance), and UV filters found in sunscreen BP-3 and OC. Uptake in the test bivalves was observed at exposures of 10 µg/l for each compound and maximum tissue concentrations in tissues at the end of the exposure phase (26 days) were 0.68 µg/g, 24 µg/g, 0.81 µg/g, and 1.52 µg/g for OTNE, BP-3, OC, and TCS, respectively (Pintado-Herrera et al. 2024). No lethal effects were observed at the 10 µg/L exposure concentration, but the authors noted changes in some enzyme activity and DNA damage in the exposed bivalves (Pintado-Herrera et al. 2024).

In general, WWTPs are inefficient in removing many PPCP compounds because of the variability in usage of these products and to their physicochemical properties, which contribute to their complex behavior in the aquatic environment (Tarpani and Azapagic 2018, Zepon Tarpani and Azapagic 2018). Biel-Maeso et al. (2019) monitored the concentrations 66 PPCPs in WTTP influent and effluent, sludge, and compost samples. Synthetic fragrances were prevalent and higher concentrations of UV filtering compounds were noted during the summer months in the influent samples. Thirty of the compounds had relatively poor removal efficiencies (< 70%) and were always detected in the final WTTP effluent. The highest concentrations in the effluent were observed for the UV filter OC and for three synthetic fragrances including OTNE (Biel-Maeso et al. 2019).

Research by Kumar et al. (2019) in New Zealand identified various PPCPs in wastewater entering a treatment plant, with NSAIDs and caffeine being most prevalent. While some compounds like

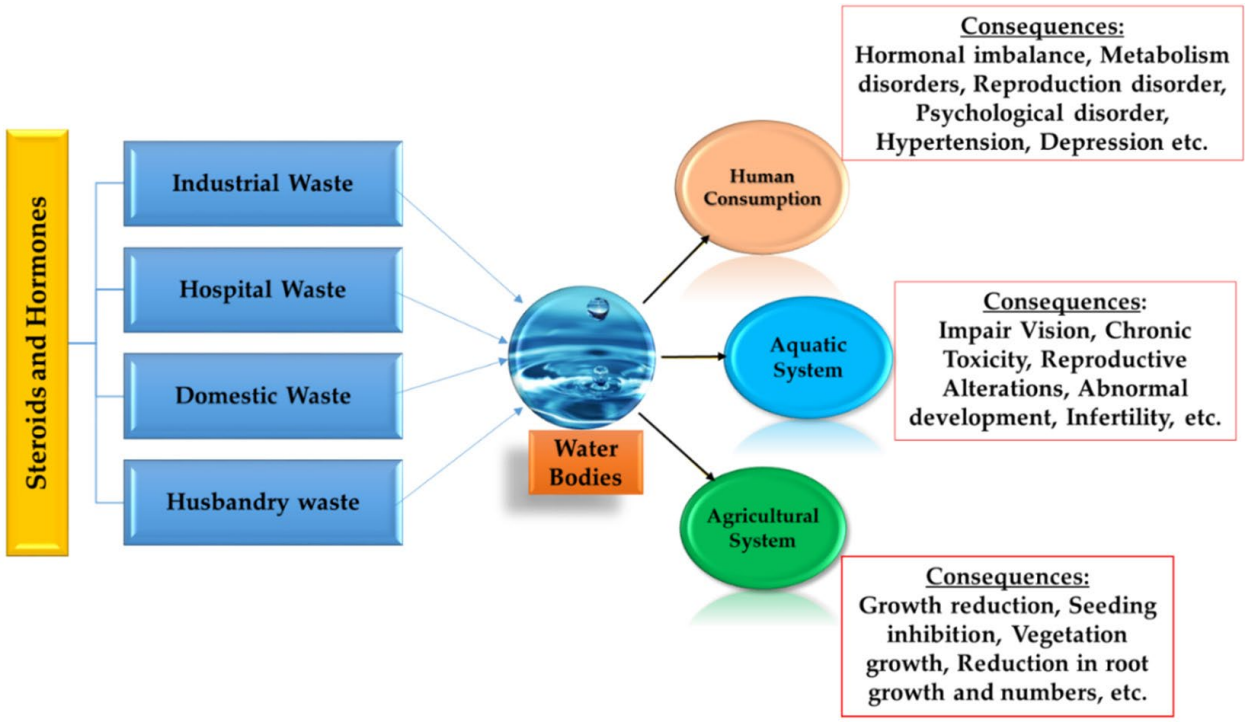
acetaminophen and ibuprofen were highly removed, others such as trimethoprim and benzotriazole persisted in the effluent. A later study by the same authors (Kumar et al. 2023) suggested that some PPCPs reappeared during treatment from the breakdown of their conjugated forms. Similarly, Liu et al. (2023b) found certain PPCPs emerging later in the treatment process at a Beijing facility, noting that anoxic treatment effectively removed most PPCPs, except for compounds like carbamazepine and metoprolol.

F.1.3.5 Sterols and Hormones

Steroids and hormones consist of both naturally occurring compounds and structurally related synthetic analogues (NMFS 2019a). Steroid-based alcohols, known as sterols, are the most abundant steroids. Cholesterol is found in cell membranes and is the most common sterol in vertebrate physiology; it is an essential component in the biosynthesis of many biologically active steroids such as bile acids, corticosteroids, and sex hormones. Hormones are intercellular chemical messengers. They are synthesized in and secreted from cells and function in low concentrations by binding to a stereospecific target-cell receptor to activate a response in that cell (NMFS 2019a). Some hormones are classified by chemical structure as steroids. Steroid hormones include the sex hormones, which include natural estrogens, synthetic estrogens such as 17 alpha-ethinyl estradiol, progesterone, and testosterone. Other hormones are comprised of polypeptides or amino acid-derived compounds (NMFS 2019a).

Sterols and hormones can be naturally excreted in urine or feces and discharged in domestic sewage (NMFS 2019a). The most common sources of steroid hormones in the environment are human and livestock excretion, veterinary medicines, agricultural runoff, and pharmaceuticals (Almazrouei et al. 2023). As with other EPOCs these compounds can cause endocrine disrupting effects in invertebrates, fish, and marine mammals (Fossi and Marsili 2003, González et al. 2020, Grzegorzek et al. 2024, Oberdörster and Cheek 2001, Reijnders 1999, Zhou et al. 2009) and studies have reported that synthetic estrogens can cause adverse pregnancy outcomes in mammals (Gonsioroski et al. 2020). Figure 6-2 shows the main sources and potential effects of sterols and hormones in the environment (Yazdan et al. 2022).

Figure 6-2. Sources and Potential Effects of Sterols and Hormones in the Environment



Source: Yazdan et al. (2022)

As shown in Table 3-6, hormones are generally not detected in Cook Inlet receiving waters except in samples collected in the immediate vicinity of the outfall (Kinnetic Environmental Inc. 2024b). Only the synthetic hormone 17 alpha-estradiol was found in receiving water samples collected at the ZID boundary (7.84 ng/L), at all three control stations located across the inlet from the AWPCF outfall (7.91 to 8.82 ng/L), and in water samples taken from Ship Creek (8.79 ng/L) and at the stormwater outfall near Postmark Drive (10.9 ng/L [estimated]). However, this compound was not detected in AWPCF effluent, nor was it detected at any other ZID locations (Kinnetic Environmental Inc. 2024b). Estrone, androstenedione, androsterone, norgestrel, progesterone, and testosterone were detected in the effluent (33.1, 162, 57.1, 81.8, 56.6 and 71.7 ng/L, respectively) and at lower concentrations at the outfall. They were not detected at nearfield or farfield ZID sampling locations (refer to Table 3-6).

As summarized in Alsop and Wilson (2019) and citations therein, ethinyl estradiol is a bioactive compound found in female contraceptives and has been shown to induce the expression of yolk development in male zebra fish and development of oocytes in the testes with at exposures ≤ 10 ng/L. These effects were also observed at 5 ng/L in fathead minnows. Additionally, in a review of literature encompassing several decades, Matthiessen et al. (2018) concluded that ethinyl estradiol and other estrogens found in sewage effluents are causing widespread endocrine disrupting effects on fish populations. The authors further note that there is some evidence of damage to the breeding capability of affected fish populations (Matthiessen et al. 2018). Meador et al. (2016) concluded that hormones are the most potent endocrine disrupting compounds that can affect fish at low ng/L concentrations in the water and that dietary uptake may also be a substantial source of these compounds for fish species. According to Grzegorzek

et al. (2024) and citations therein, even at trace levels, hormones may strongly influence reproduction behaviors, gene expressions, or endogenous hormone levels in fish.

Almazrouei et al. (2023) summarized the occurrence of steroid hormones in select WWTP effluents from locations around the globe. The authors reported effluent concentration ranges of 0.06-265 ng/L for progestins, 0.2-196.7 ng/L for estrogens, and 0.12-30.5 ng/L for androgens. The most common techniques to remove steroid hormones from wastewater include biological treatment, photocatalytic degradation (UV light), membrane systems, advanced oxidation, and adsorption (Almazrouei et al. 2023).