

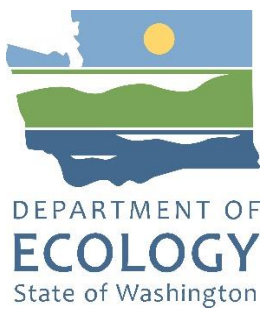
Earthjustice

Please see attached attachments to Earthjustice Comment Letter, part 2 of 3.



Photo Credit: Richard Bell

Source Assessment of PBDEs Impacting Juvenile Chinook in the Snohomish River System



Alex Gipe

EAP, Toxics Studies Unit

agip461@ECY.WA.GOV

Snohomish PBDE Source Assessment

- Ecology lead source assessment of PBDEs from 2019 to 2022 in Snohomish, Skykomish, Snoqualmie Rivers
- Assess and prioritize potential sources of PBDEs that may be impacting the health of outmigrating juvenile Chinook
- Identify potential pathways of PBDEs from source to juvenile Chinook
- Monitored PBDEs during low (late summer) and high (spring) river flow conditions
 - 6 sampling event, 4 low flow, 2 high flow

Methods

- Water – passive samplers (SPMDs), estimate water conc. integrated over ~30 days
- Biofilms – mixture of algae, cyanobacteria, detritus; collected from river substrates
- Sediment – benthic and suspended, collected throughout estuary
- Invertebrates – mixture of species; juvenile Chinook prey items; surface tows/algae mats
- Analyzed samples for 43 PBDE congeners by EPA Method 1614A



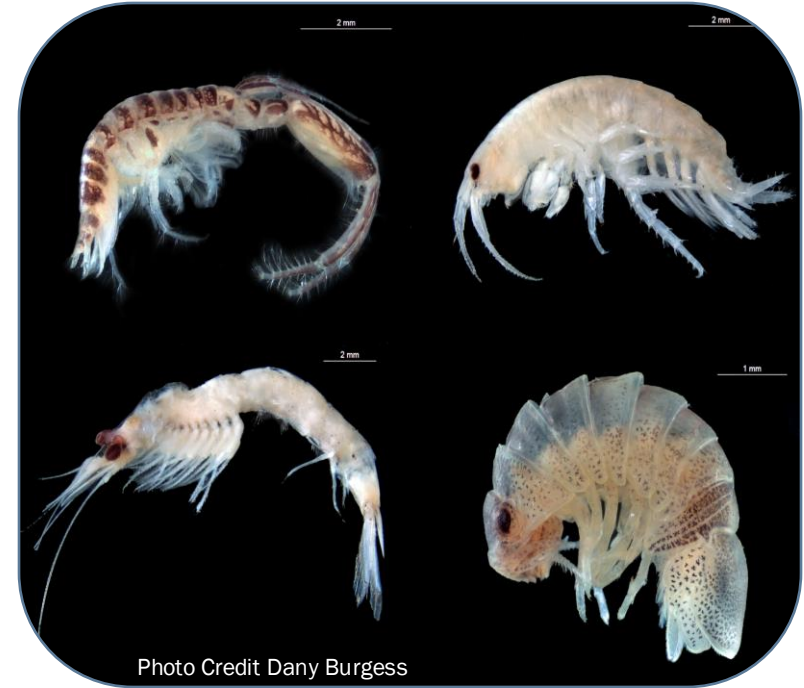
Passive Sampler



Biofilms



Sediments



Invertebrates



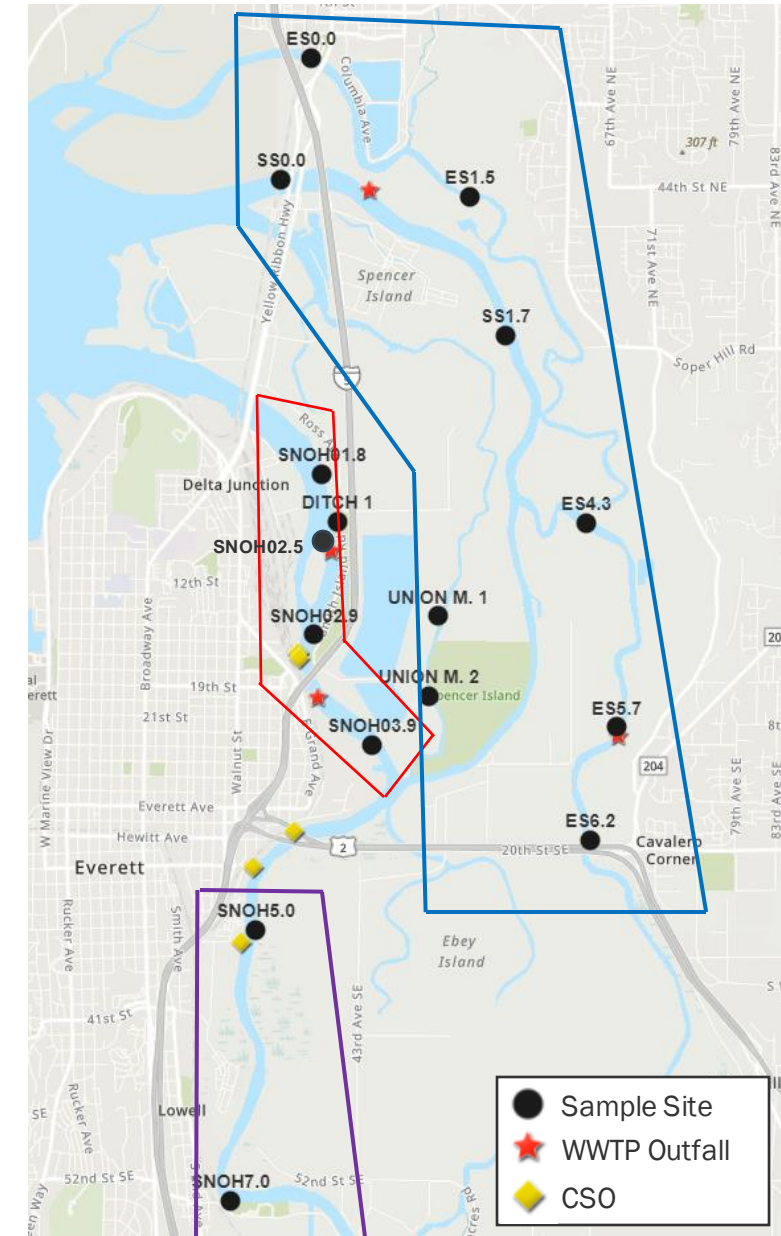
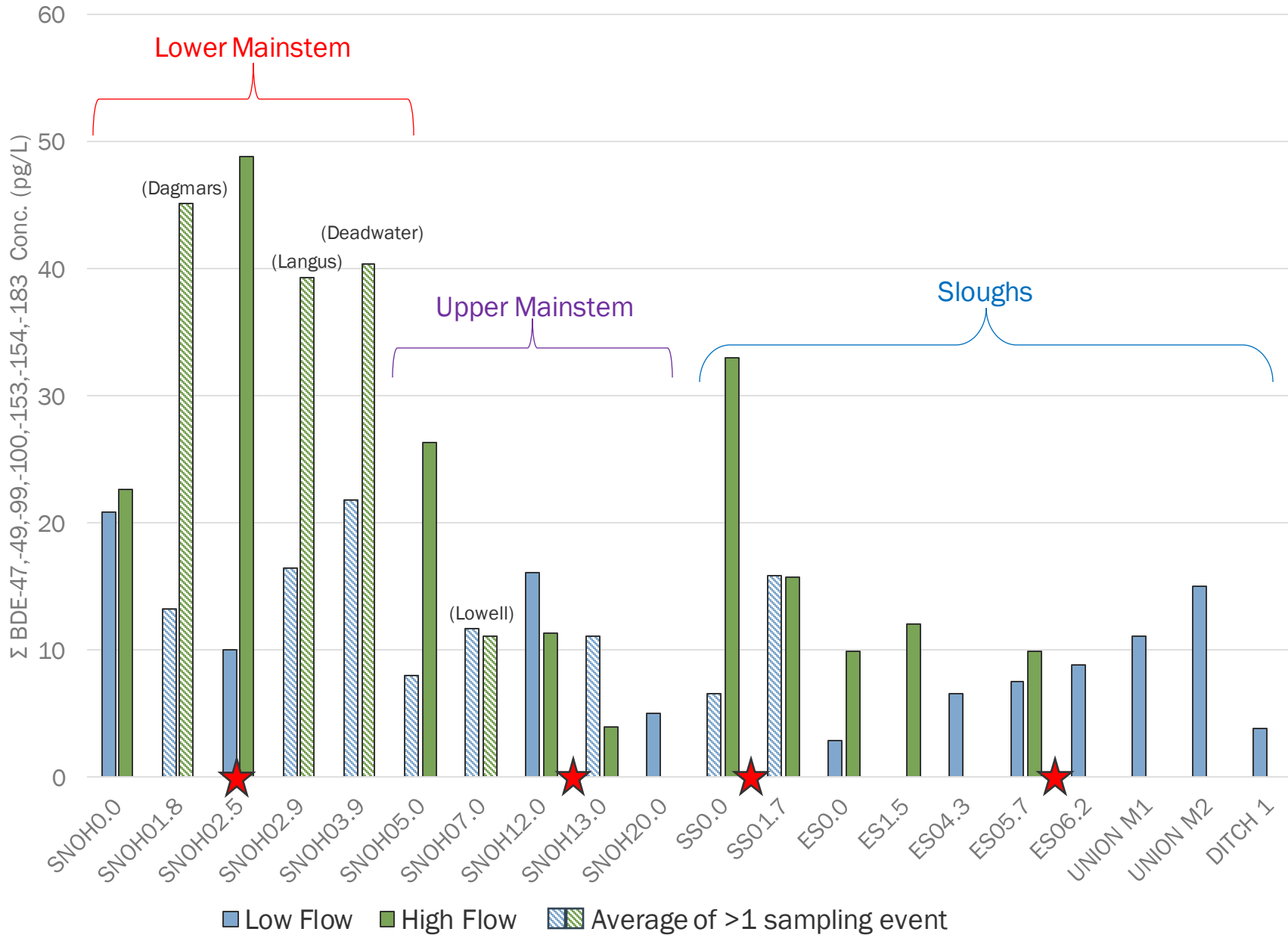
Study Results

PBDEs in water
& sediments

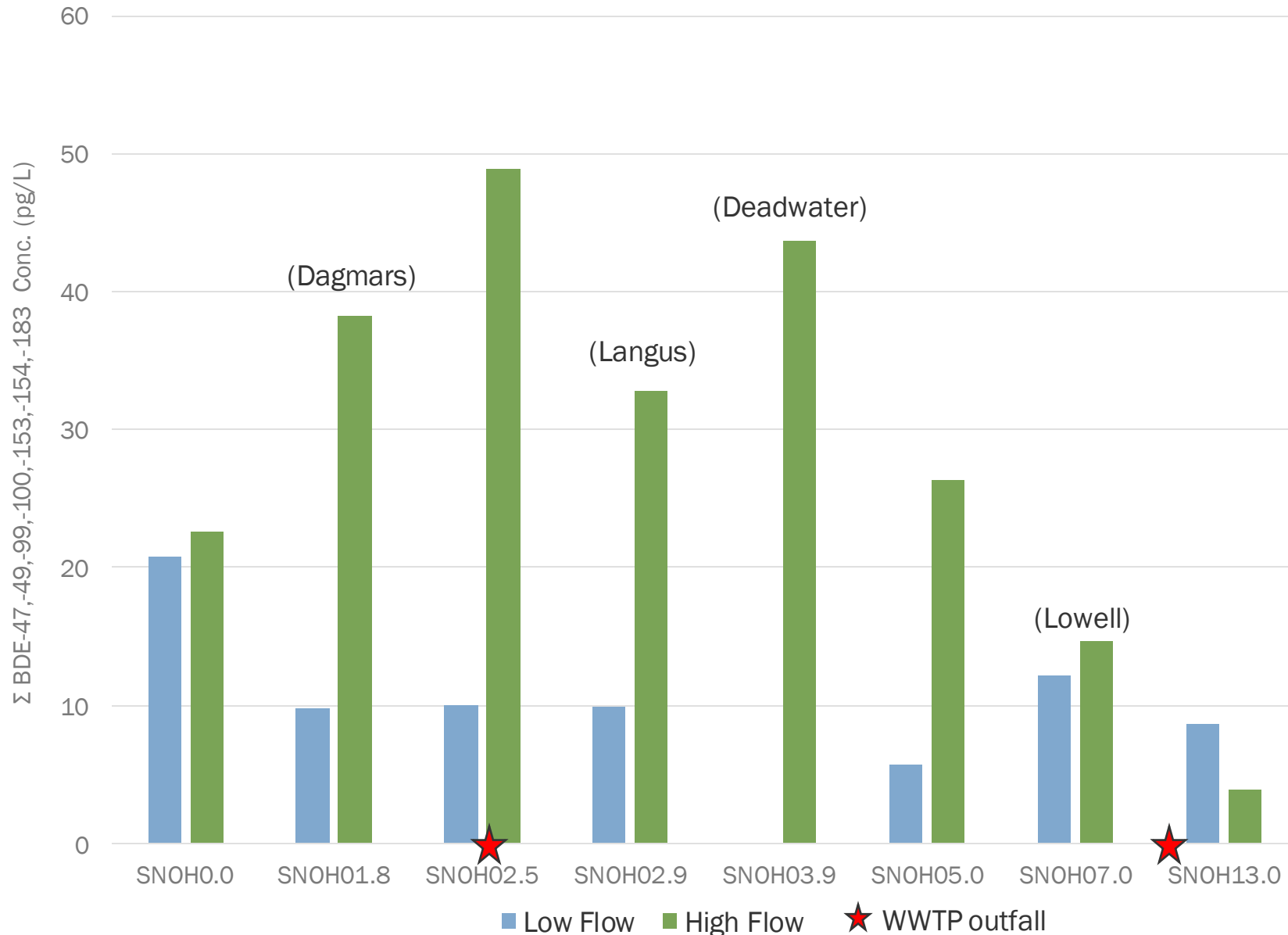
Prey Item
Concentrations
and Temporal
Trends

PBDE
Accumulation
and
Concentration

2019-2022 PBDE Water Concentration in Snohomish River & Estuary

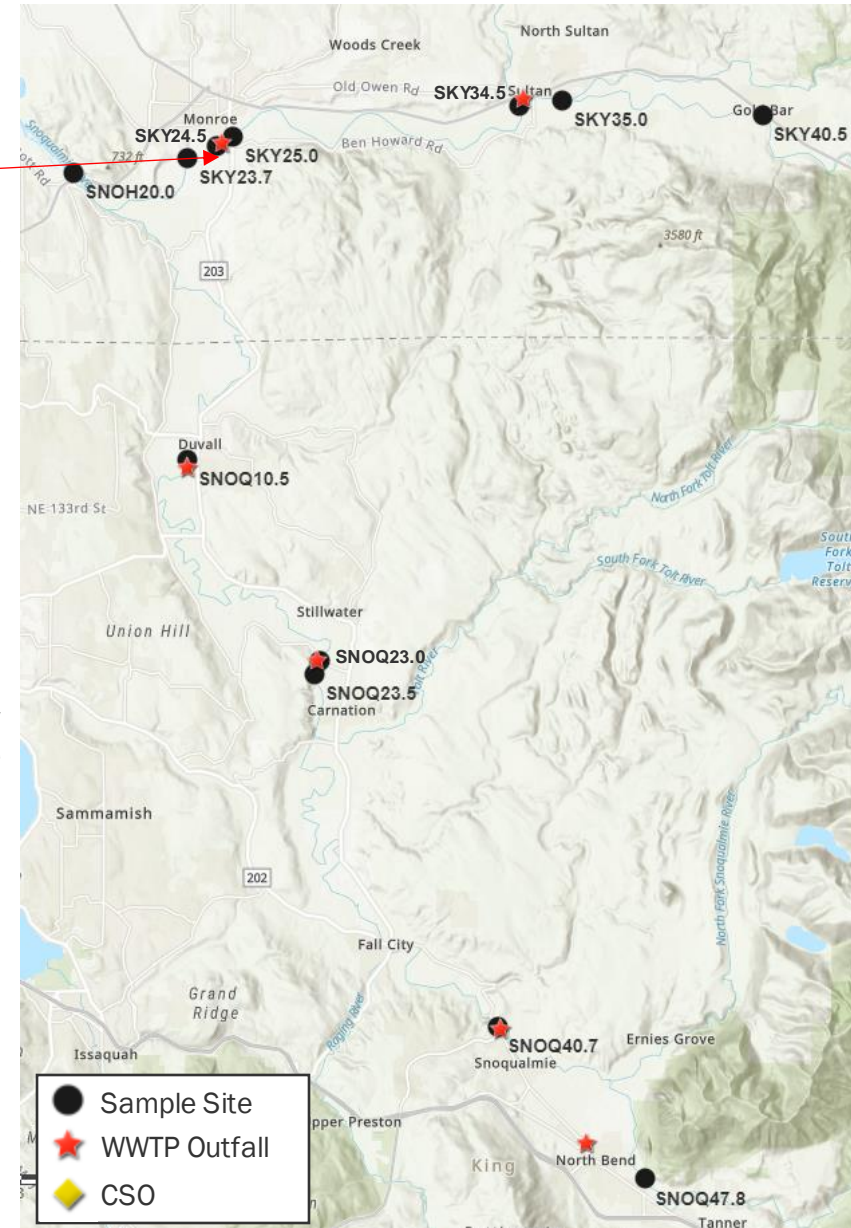
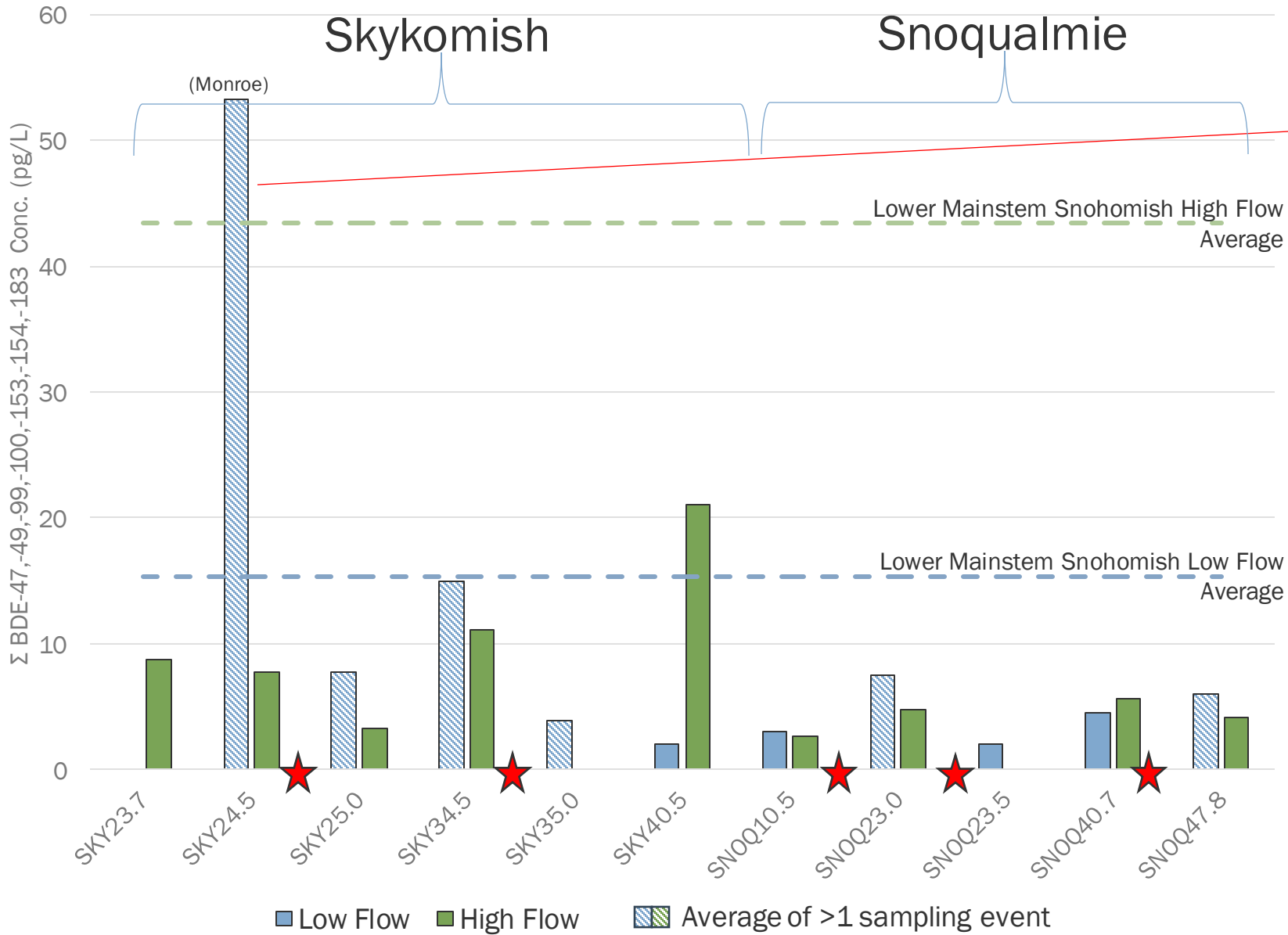


2022 Snohomish Main Stem High vs Low Flow PBDE Water Concentrations



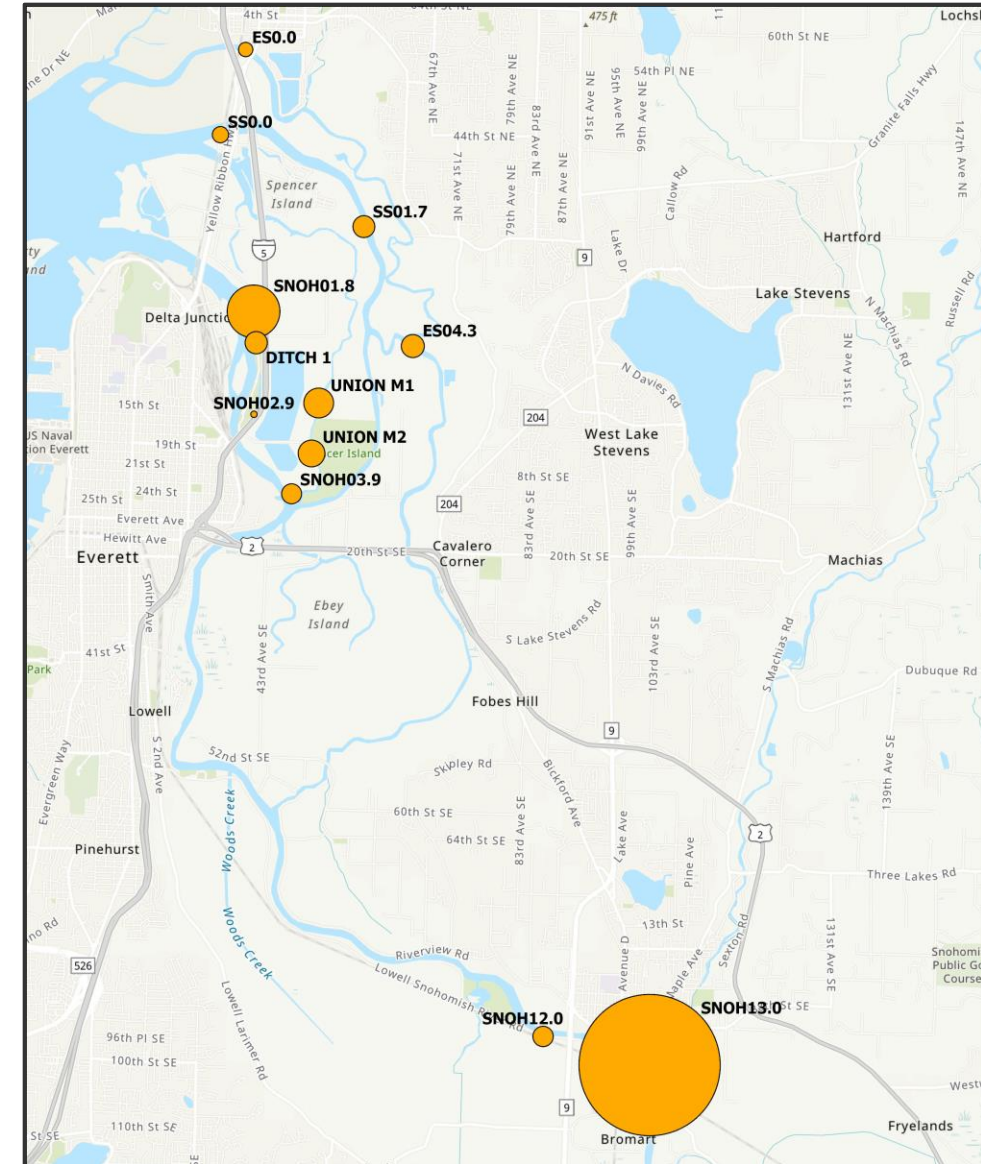
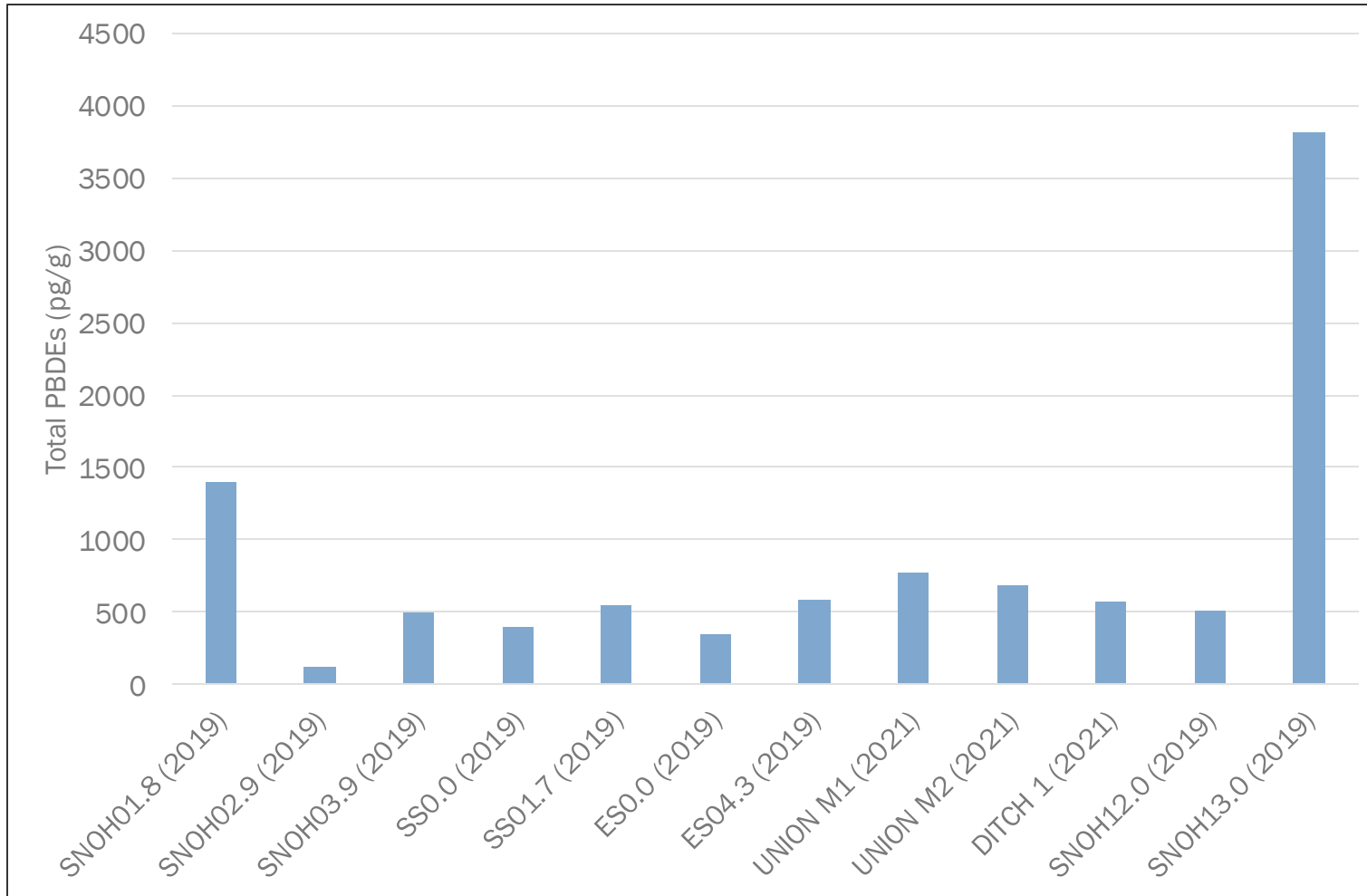
- Everett WWTP Outfall 015 discharge
 - No Discharge during Low Flow Sampling period
 - Active Discharge during High Flow Sampling period

2019-2022 Total PBDE Water Concentration in Skykomish & Snoqualmie Rivers



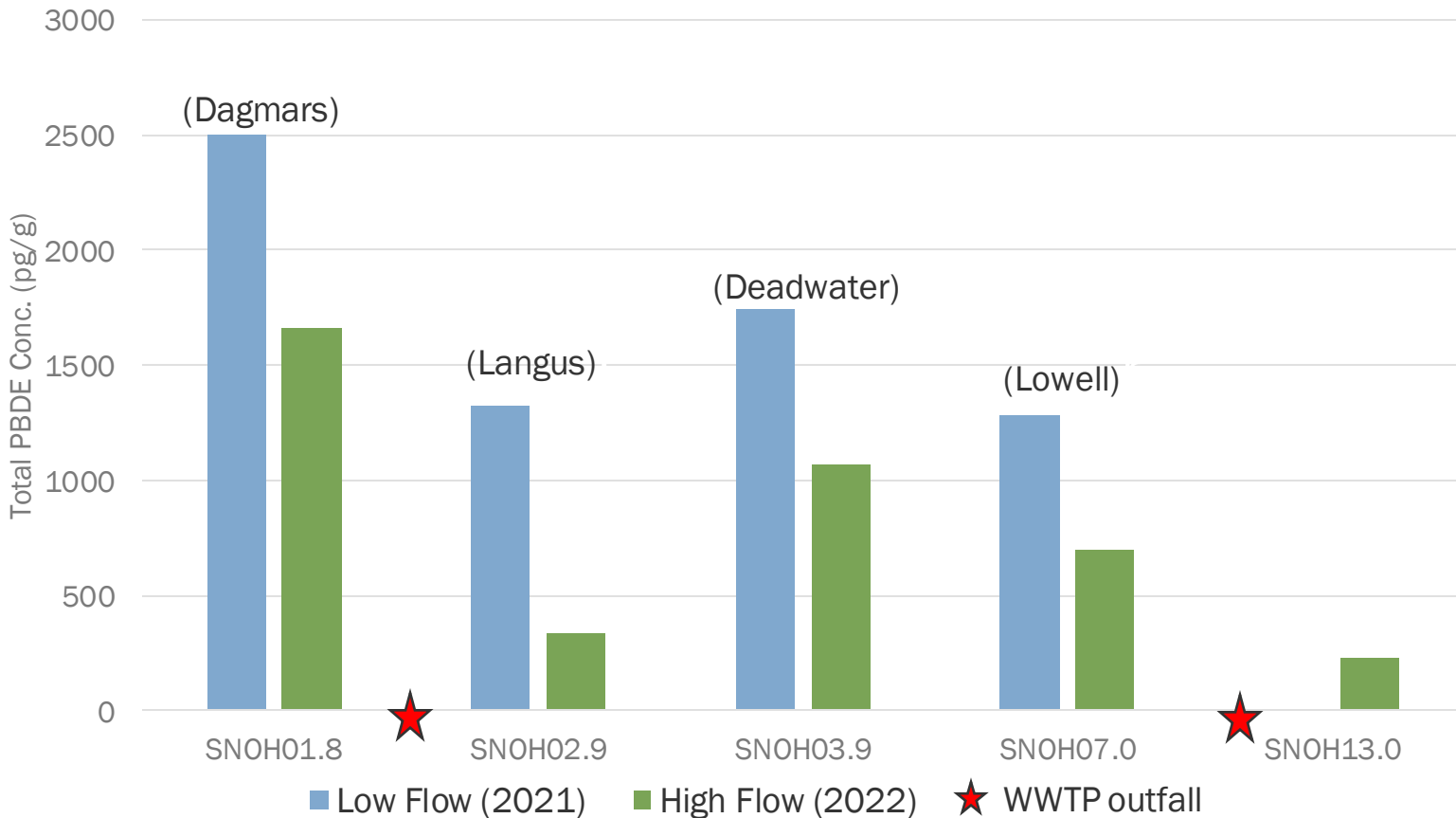
PBDEs in Bottom Sediments

- Concentration Range from 130 to 3800 pg/g
- Highest concentrations at SNOH01.8 & 13
- Similar concentration across sloughs



Suspended Sediments

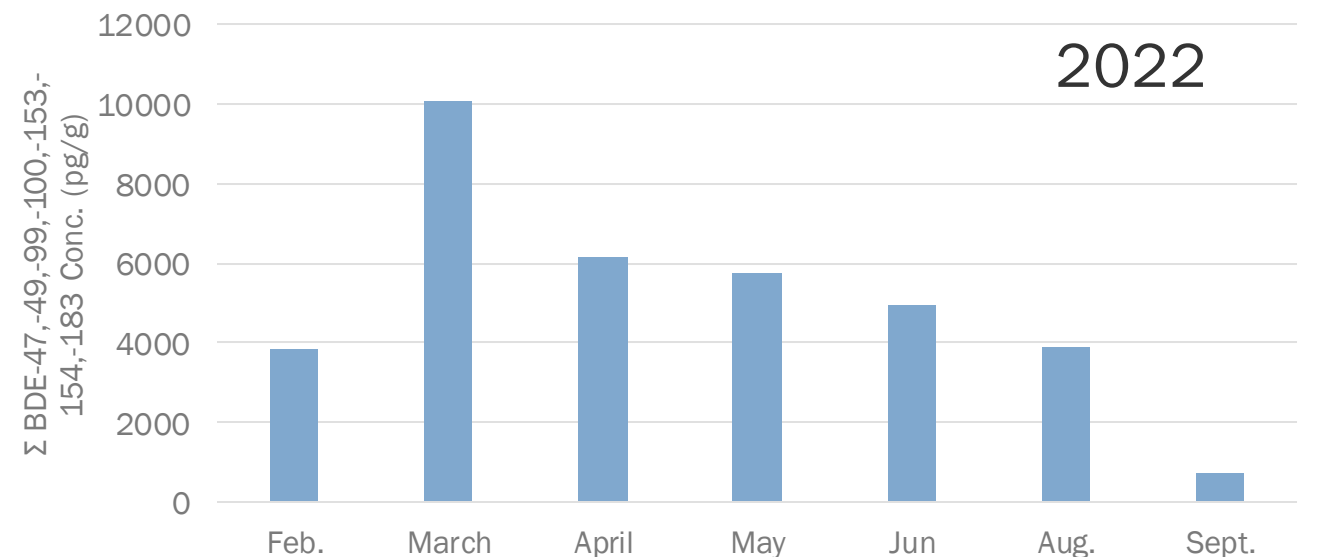
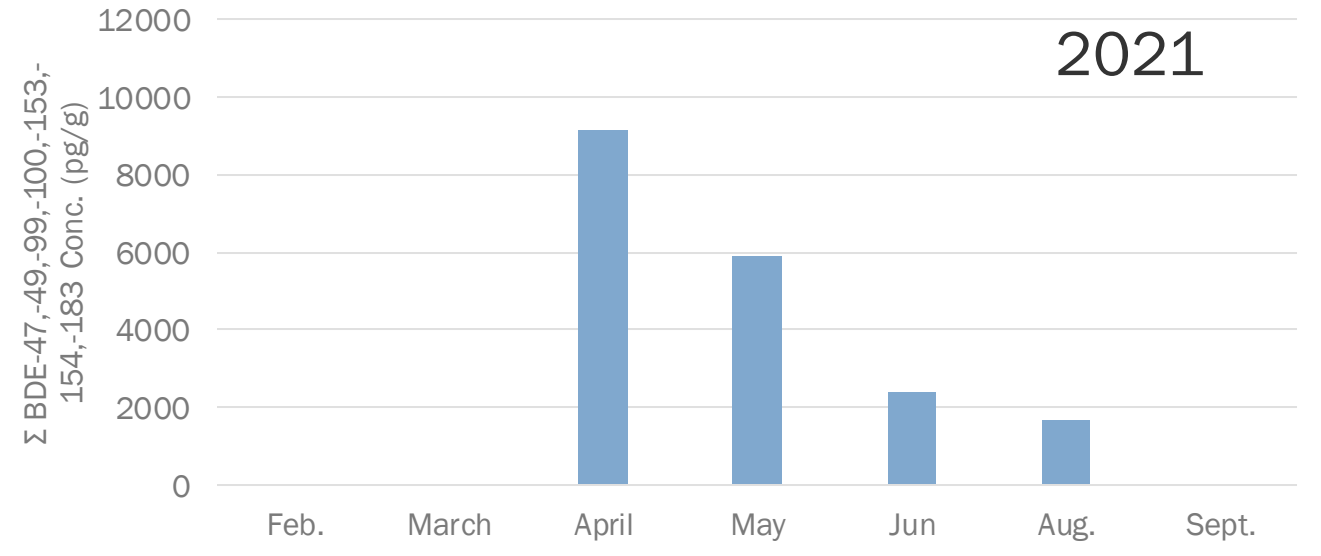
High vs Low Flow Suspended Sediment Total PBDE Concentrations



- Low Flow- similar concentration of PBDEs along main stem
- High Flow- varying PBDE concentrations
- Active WWTP discharge during both events

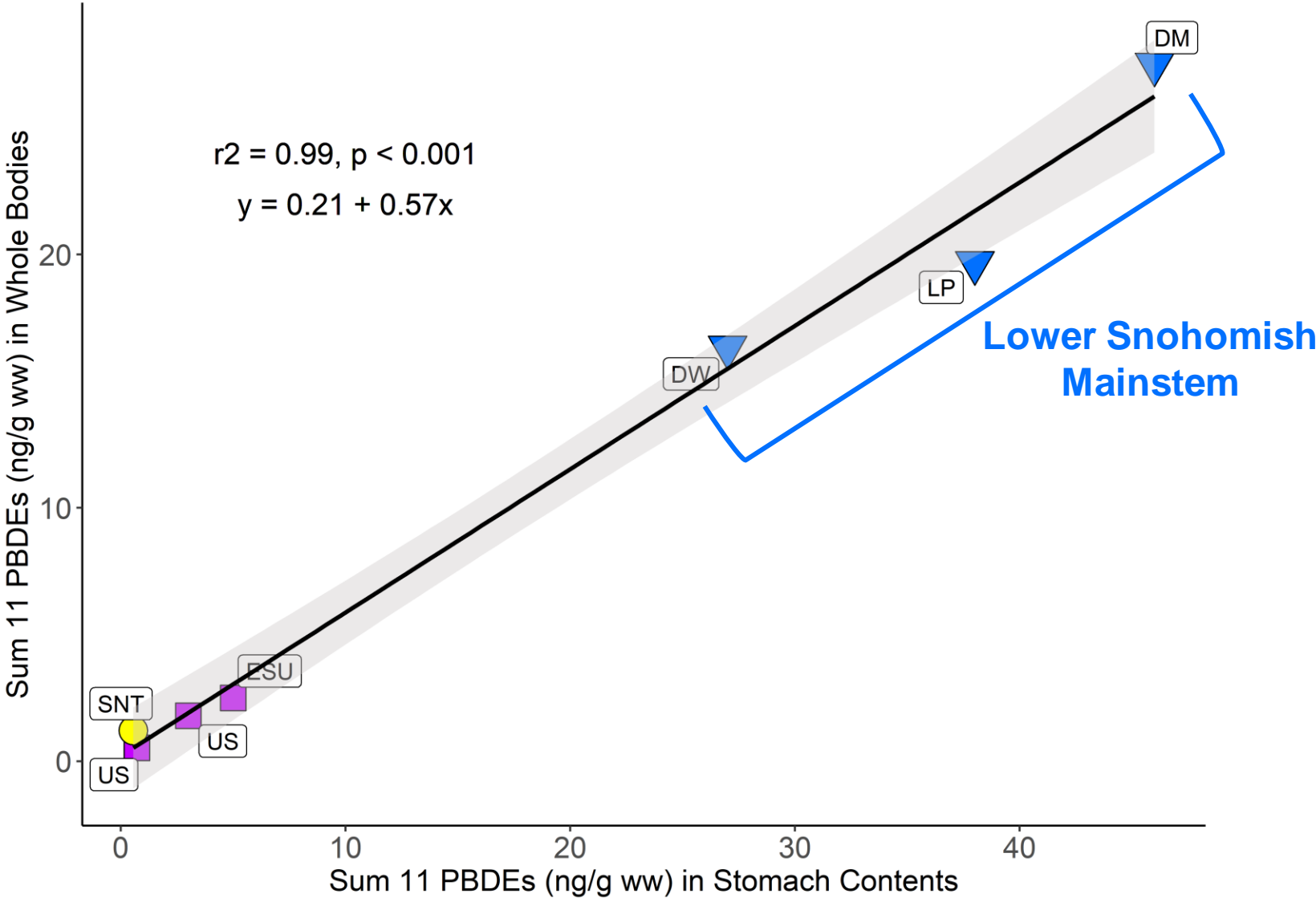
Temporal Variations in Invertebrate PBDE Concentrations

- Highest PBDE concentrations occur in spring
 - Coincides with occurrence of juvenile Chinook in Snohomish estuary
- Declining trend in concentrations over summer
- Similar temporal pattern in 2021 & 2022
- Max 2021-2022 PBDE concentration ~7x greater than 2019 low flow event invertebrates

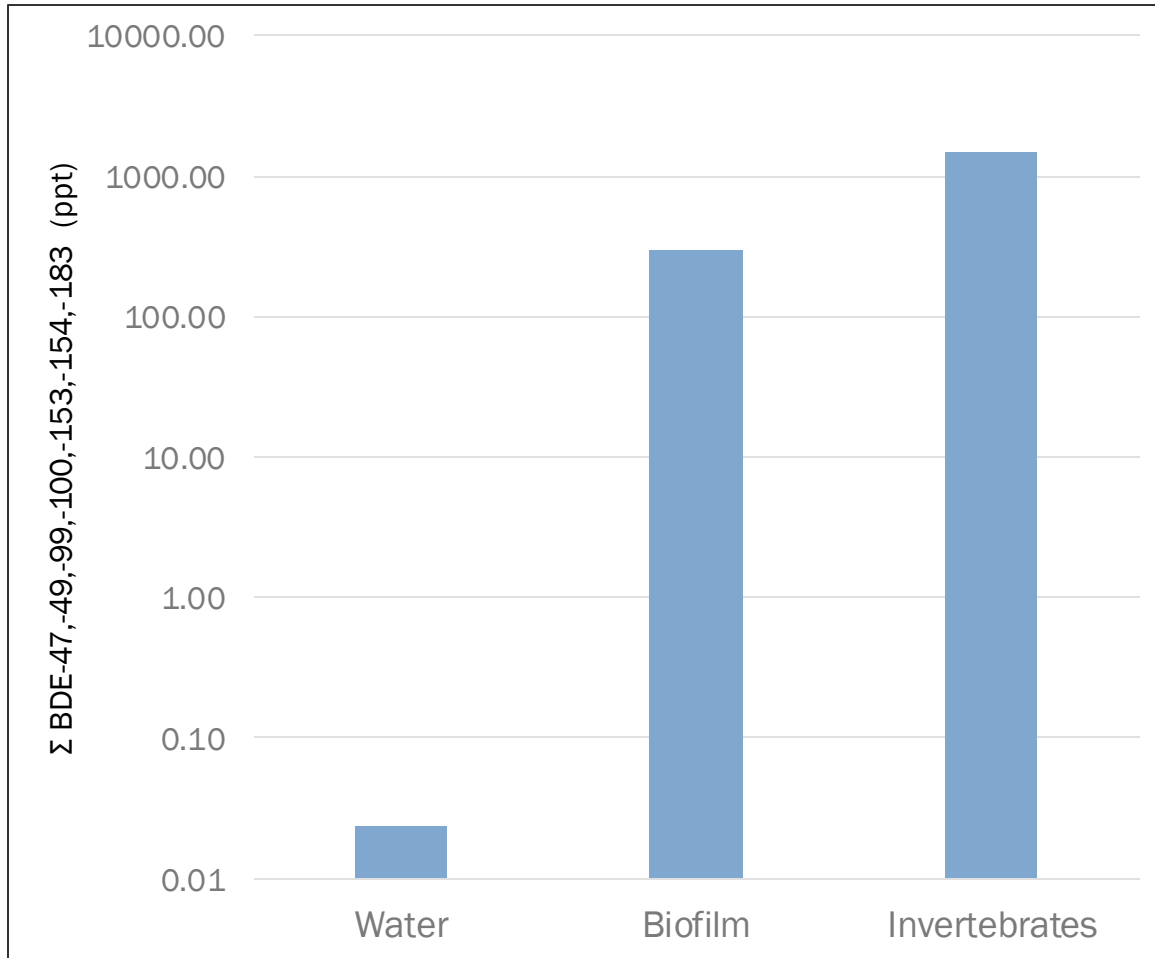


PBDEs in Juvenile Chinook Stomach Contents

Juvenile Chinook are accumulating the PBDEs from their food source

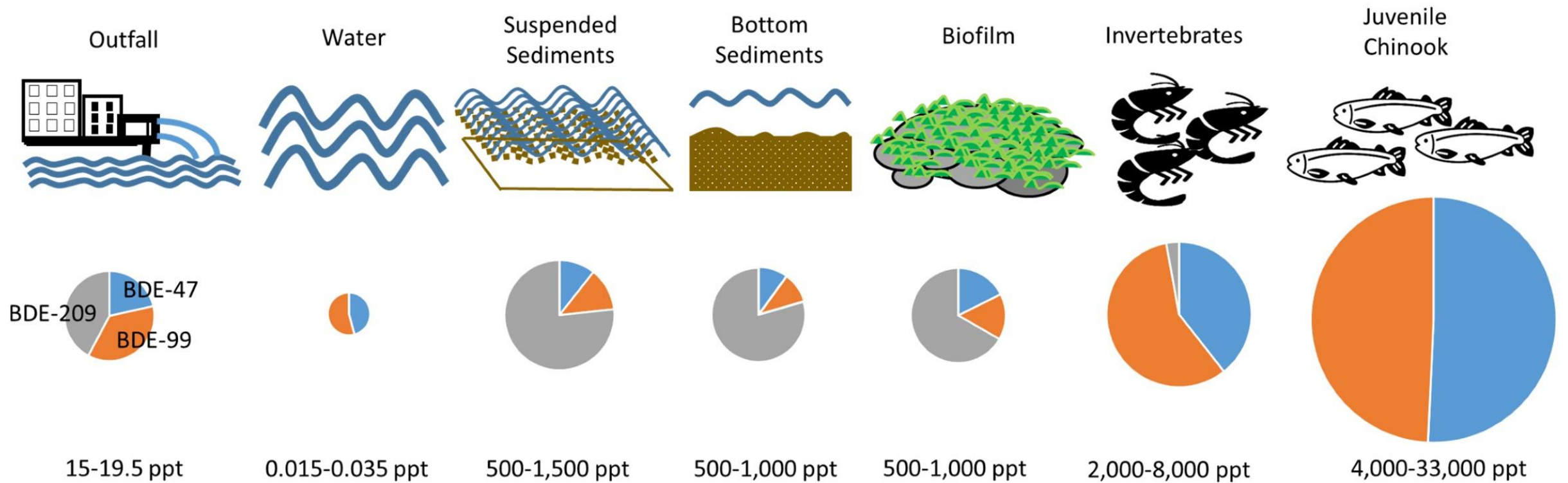


PBDE Accumulation & Concentration



- Water conc. average = 0.024 ppt
- Biofilm conc. average = 297.1 ppt
 - ~12,500x increase from water
- Invertebrate conc. average = 1477.3 ppt
 - ~5x increase from biofilms
- Primary producers (biofilms) and invertebrates concentrate and accumulate PBDEs
- Calculated from average conc. measured during 2019 low flow sampling event

PBDEs in the Snohomish Estuary



Results Summary

- Elevated PBDE concentrations in lower Snohomish main stem & near city of Monroe
 - Elevated PBDEs in water, sediment, biofilms, & inverts.
 - Associated with WWTP discharges
- Bioconcentration and bioaccumulation of PBDEs from water to biofilms and invertebrates
- Temporal trend of invertebrate PBDE concentrations in Snohomish mainstem
 - Highest in spring, declining through summer
 - Juvenile Chinook prey contain high levels of PBDEs
- PBDE congener accumulation differs across environmental media

Study Conclusions

- WWTP discharges of PBDEs impact localized areas surrounding the discharge zone in the Snohomish mainstem and near the city of Monroe
- Uptake and transformation of PBDEs in the food web concentrates and increases potential impacts on outmigrating juvenile Chinook salmon in the Snohomish estuary





Acknowledgements

WDFW

Sandie O'Neill

Andrea Carey

Andrew Beckman

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Josh Chamberlin

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Todd Zackey

City of Everett

John Rabenow

Dept. of Ecology

Will Hobbs

Rachel McCrea

Jessica Huybregts

Tonya Lane

Kevin Leung

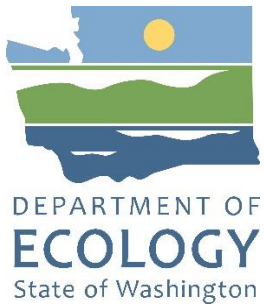
Jakub Bednarek

Elisa Rauschl

Susan Smith

Long Live the Kings

Lucas Hall

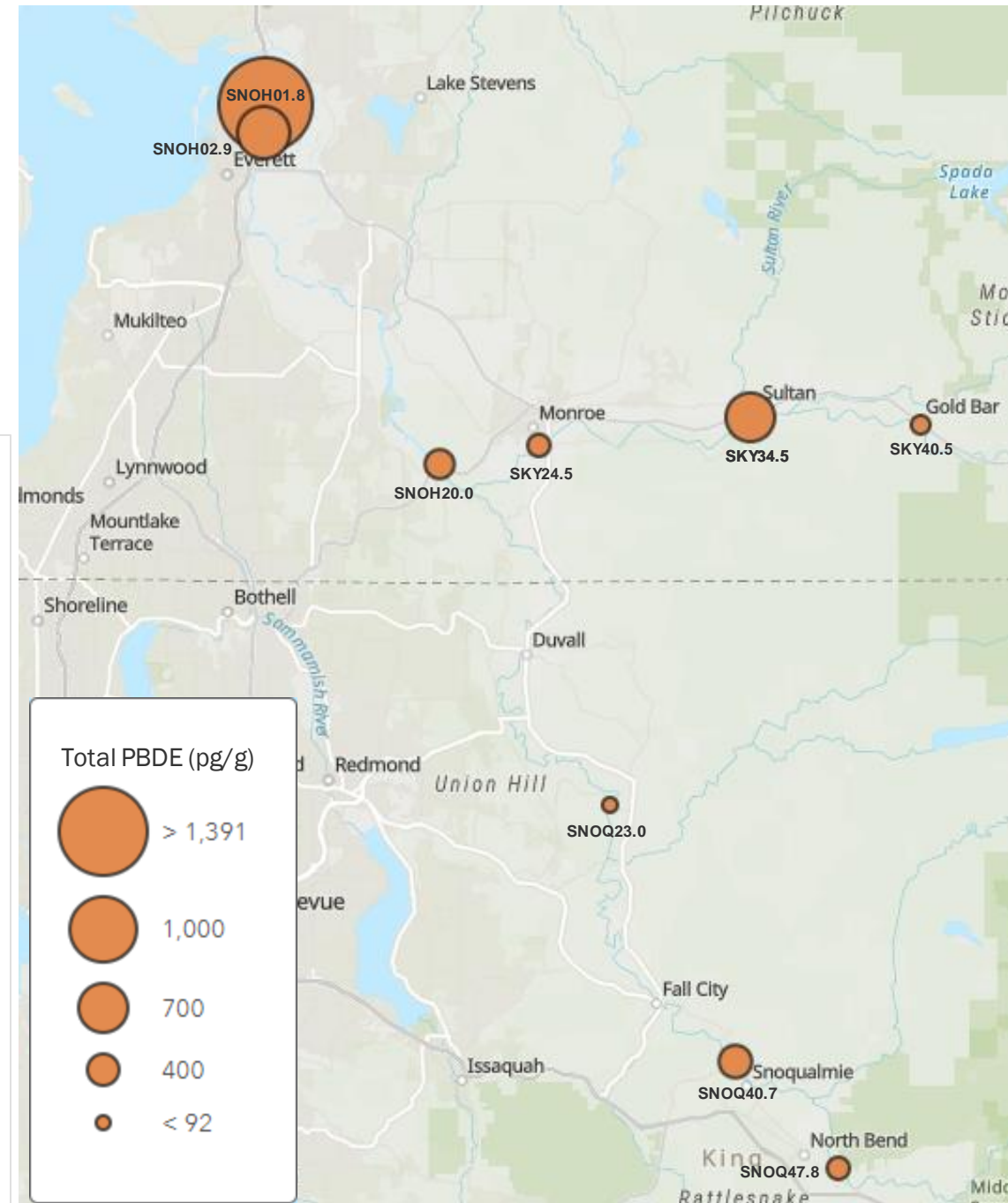
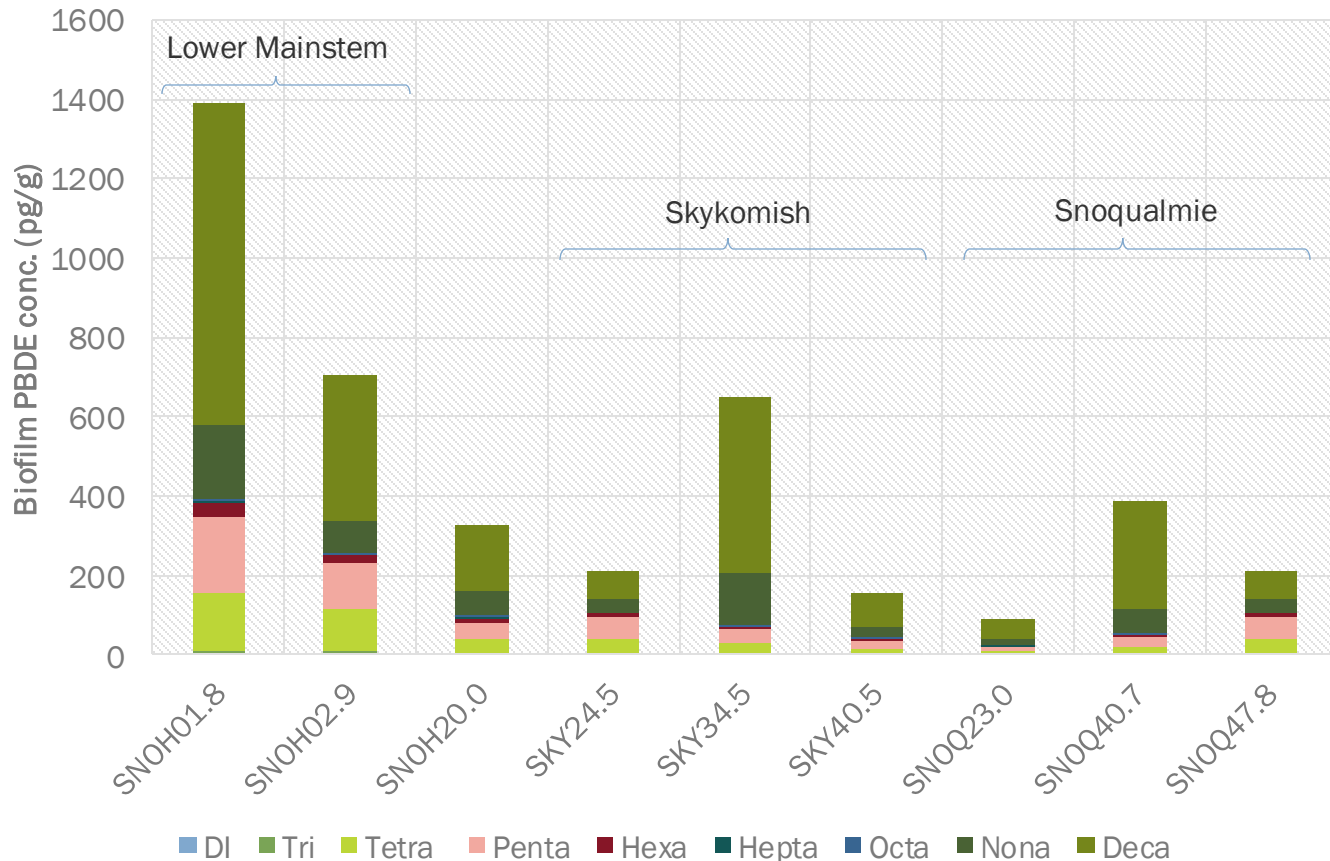


Questions?

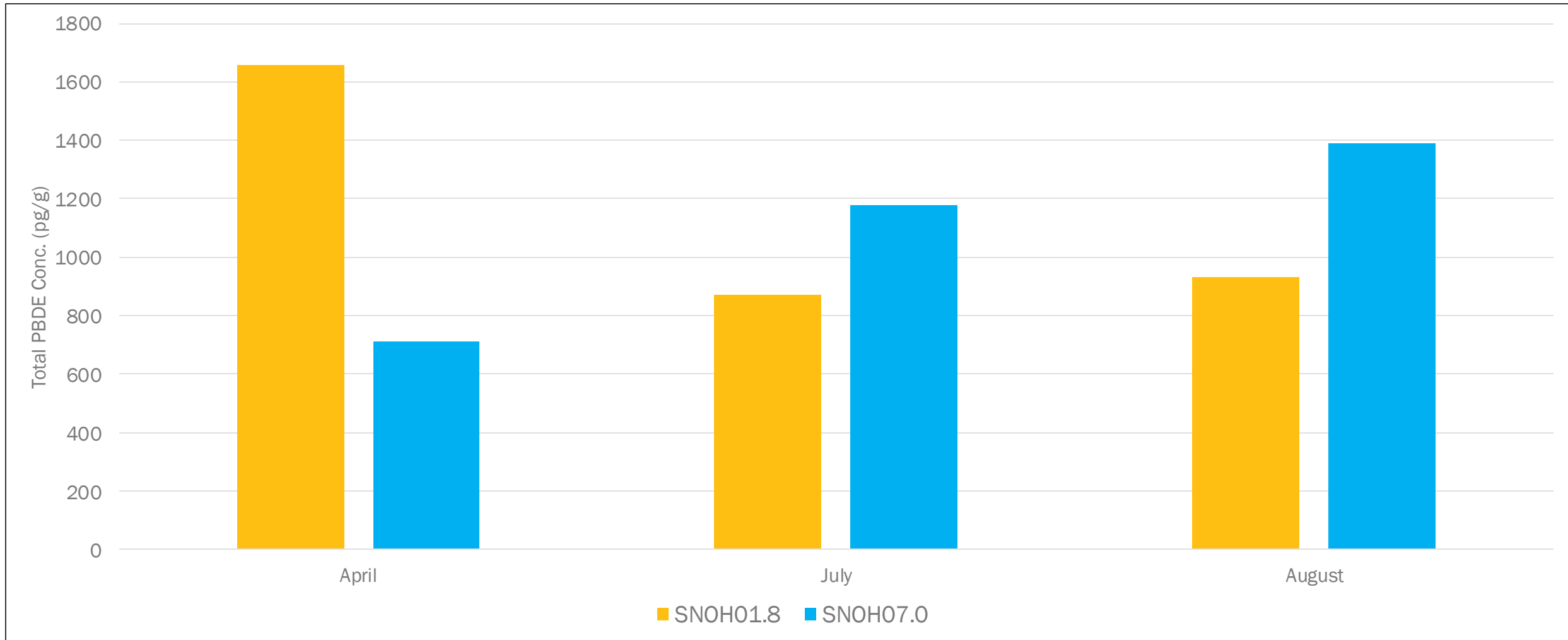
Email: agip461@ECY.WA.GOV

PBDEs in Biofilms

- Collected during 2019 low flow event
- Highest concentrations located in mainstem of Snohomish
- Elevated concentrations near city of Sultan and Snoqualmie



2022 Temporal Trends of Suspended Sediment Total PBDE Concentrations





Everett Water Pollution Control Facility

Everett Public Works
November 30, 2023



EVERETT
WASHINGTON

Agenda

- Plant overview
- Operational strategy
- Industrial pre-treatment control: PBDE



Homolog summary

Chemical of concern	Units	INFLUENT				
		2020 Q1	2020 Q2	2020 Q4	2021 Q2	2022 Q3
Polybrominated Diphenyl Ethers (Homologs)						
Dibromodiphenyl ethers	pg/L	23	22	16	0	41.3
Tribromodiphenyl ethers	pg/L	588	321	221	324	563.0
Tetrabromodiphenyl ethers	pg/L	24999	15464	12119	14293	32092
Pentabromodiphenyl ethers	pg/L	28186	18857	13418	17735	37398
Hexabromodiphenyl ethers	pg/L	4655	3369	2323	2949	5124.8
Heptabromodiphenyl ethers	pg/L	620	403	218	315	694
Octabromodiphenyl ethers	pg/L	799	454	363	731	1448
Nonabromodiphenyl ethers	pg/L	4347	1988	1584	2753	2848
Decabromodiphenyl ether	pg/L	105500	29500	22100	46900	34900
SCE-100						
Dibromodiphenyl ethers	pg/L	0.0	31.2	37.6	0.0	25.6
Tribromodiphenyl ethers	pg/L	159.6	236.0	211.2	124.4	150.1
Tetrabromodiphenyl ethers	pg/L	4769	5836	4154	2449	5496
Pentabromodiphenyl ethers	pg/L	5506	6399	4889	3119	5975
Hexabromodiphenyl ethers	pg/L	864.0	1157.3	973.2	559.0	773.0
Heptabromodiphenyl ethers	pg/L	83	96	92	54	97
Octabromodiphenyl ethers	pg/L	72	165	163	112	165
Nonabromodiphenyl ethers	pg/L	505	565	606	204	329
Decabromodiphenyl ether	pg/L	4360	4830	5640	2580	2490
FEN-015						
Dibromodiphenyl ethers	pg/L	210.8	49.9	109.0	206.4	349.8
Tribromodiphenyl ethers	pg/L	389.9	378.8	597.0	482.9	719.0
Tetrabromodiphenyl ethers	pg/L	2434	2638	5436	4868	4925
Pentabromodiphenyl ethers	pg/L	4200	4373	10799	8242	6622
Hexabromodiphenyl ethers	pg/L	1823.1	1734.1	4648.0	1666.0	1803.0
Heptabromodiphenyl ethers	pg/L	285	441	928	328	410
Octabromodiphenyl ethers	pg/L	880	998	2452	982	1420
Nonabromodiphenyl ethers	pg/L	1947	2049	5860	1655	2827
Decabromodiphenyl ether	pg/L	14700	10200	61300	7600	18900



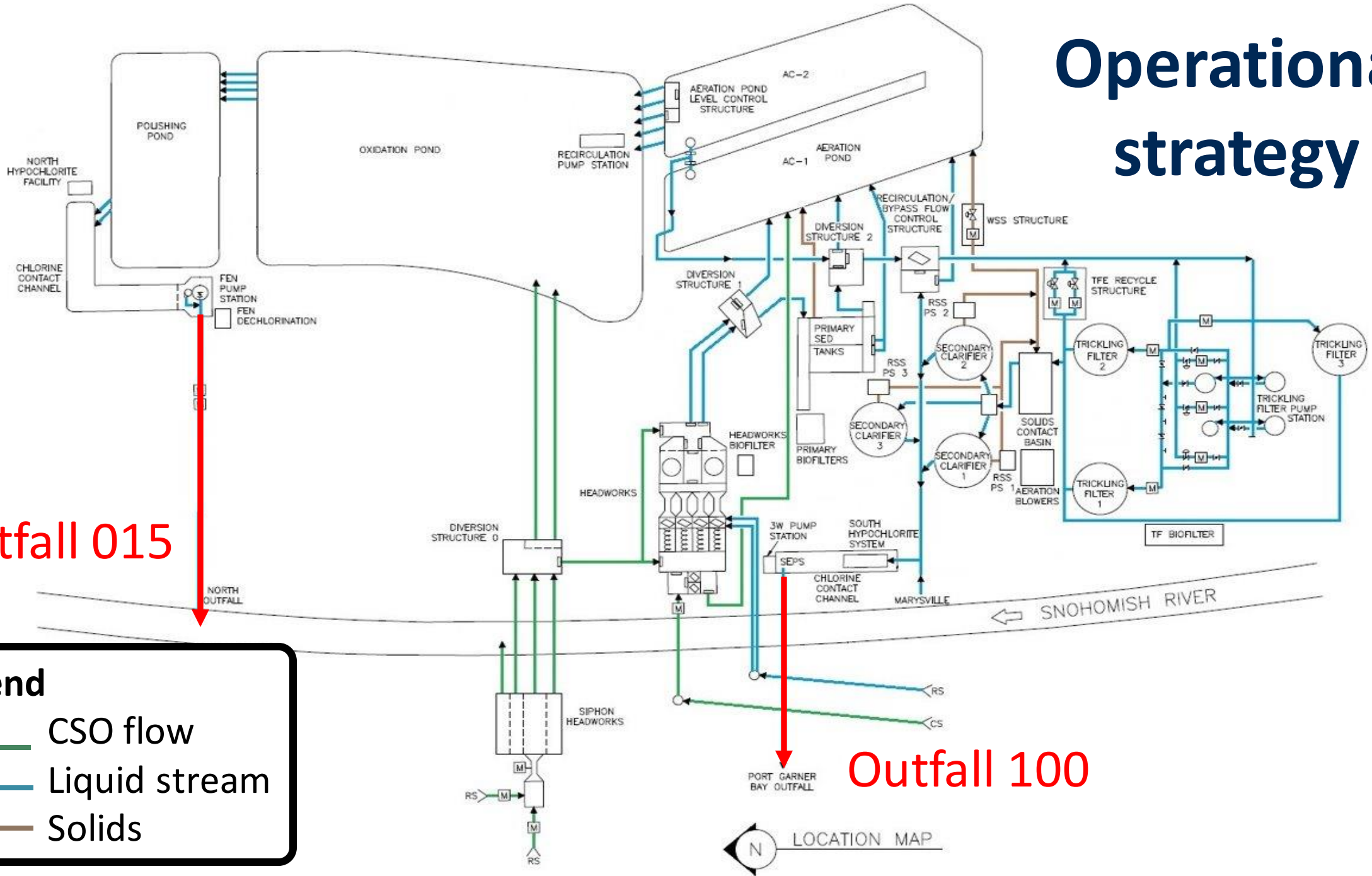
Operational strategy

Outfall 015

Outfall 100

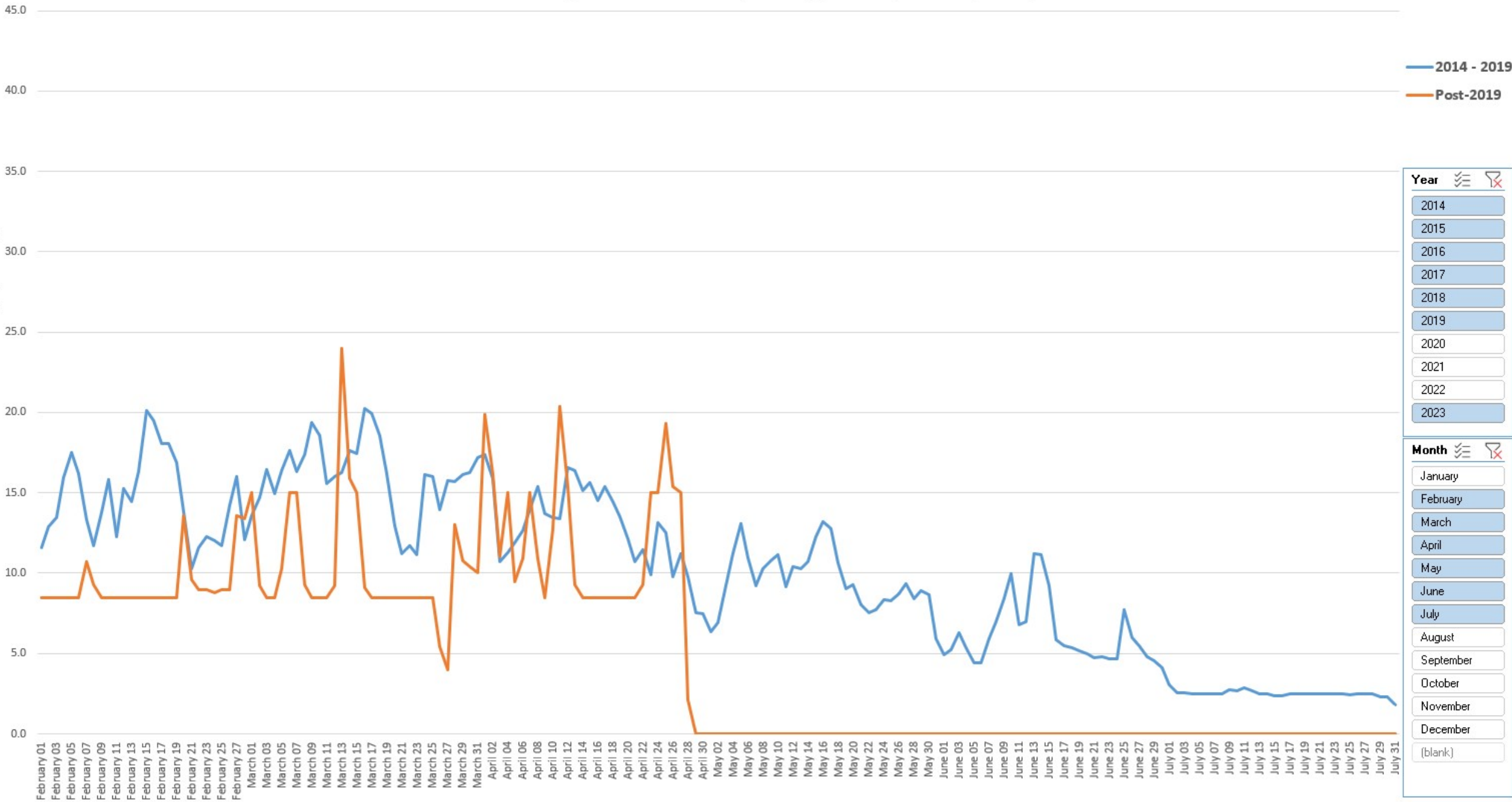
Legend

- CSO flow
- Liquid stream
- Solids



Outfall 015 (Snohomish River) Averaged Daily Flows (MGD)

Outfall 015 Flow Average (MGD)



2014 - 2019
Post-2019

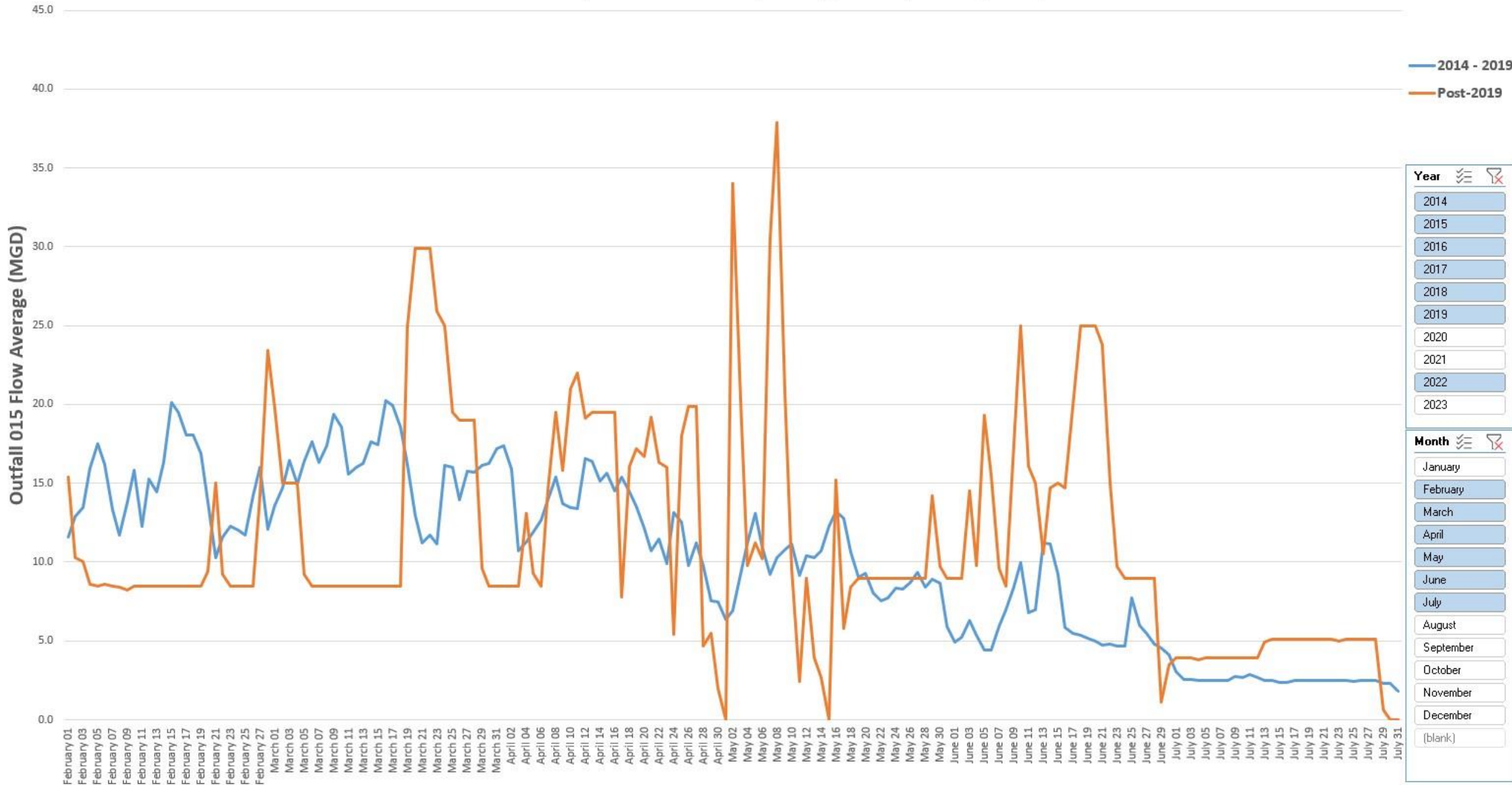
Year

- 2014
- 2015
- 2016
- 2017
- 2018
- 2019
- 2020
- 2021
- 2022
- 2023

Month

- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November
- December
- (blank)

Outfall 015 (Snohomish River) Averaged Daily Flows (MGD)



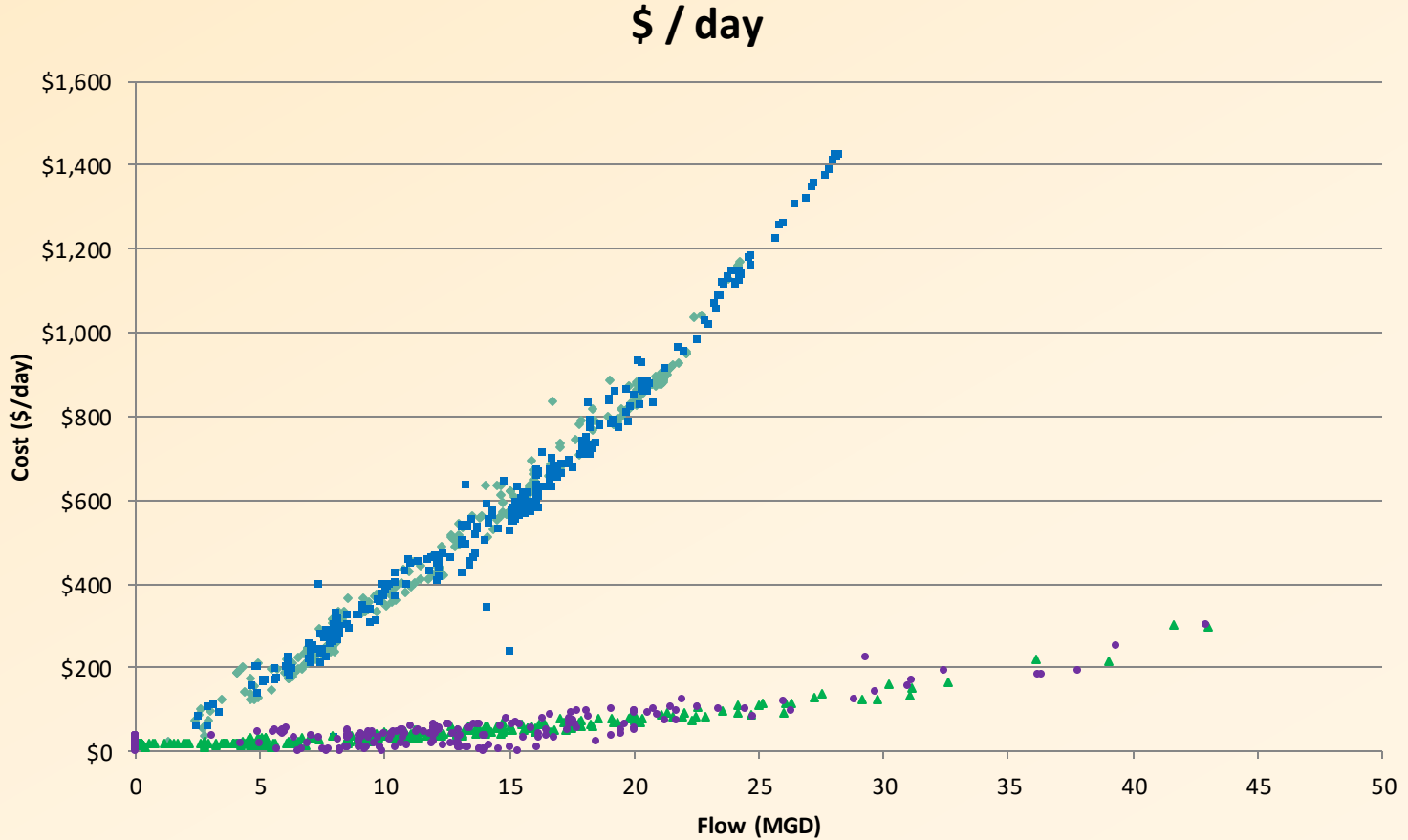
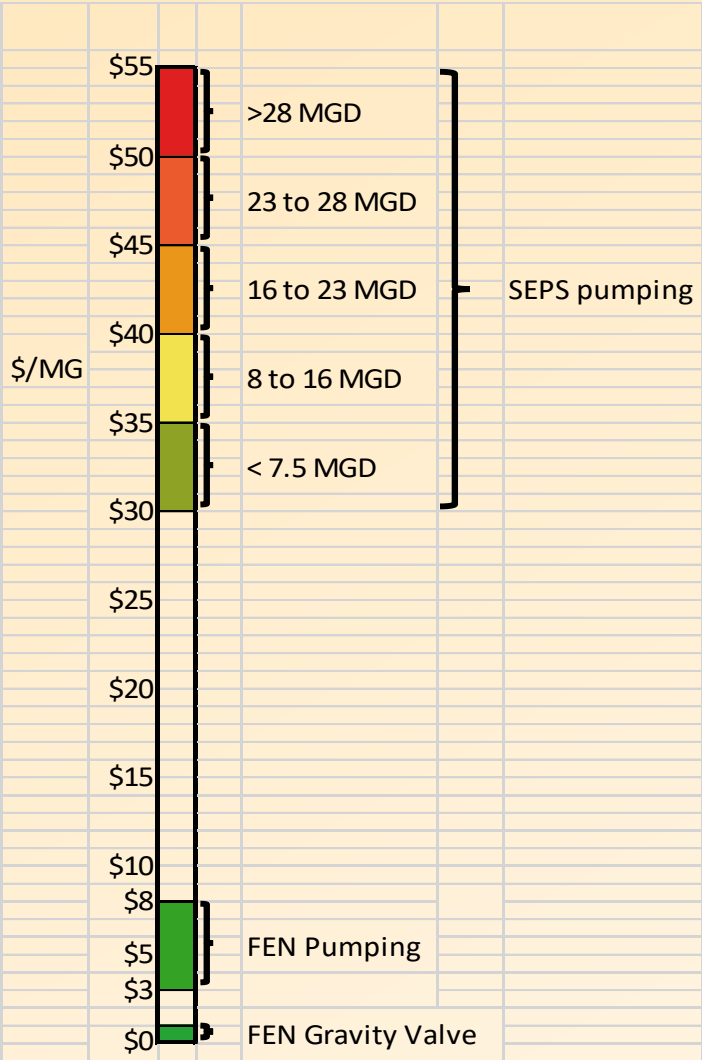
Year

- 2014
- 2015
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- 2020
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- 2022
- 2023

Month

- January
- February
- March
- April
- May
- June
- July
- August
- September
- October
- November
- December
- (blank)

Operational cost comparison – Deepwater vs river outfall



Pretreatment identification of PBDE

Existing PBDE data

- Quarterly Sampling 2020-2022
- 5 total samples covering all four quarters
- 3 sample sites
 - Final Effluent North
 - Secondary Effluent
 - Primary Influent

Industrial survey

- Update IU Inventory to include industry categories known or suspected to discharge PBDEs
- Will be performed through a survey of the entire industrial community
- Due with the annual report on April 1, 2025



Pretreatment control of PBDEs

Modify permits

- Legacy pollutant
- Historical usage / Current usage
- Contamination reduced or eliminated?
- Action Plan

Best Management Practices (BMPs)

- Evaluate BMPs and pollution prevention practices for use in permits to control PBDE discharge
- Product or equipment substitution
- Good housekeeping practices



Monitoring for PBDEs

- Monitor influent PBDE concentrations semiannually
- 2026 and 2027
- Results reported on semiannual DMRs
- Evaluate the results relative to previous sampling 2020-2022
- Evaluate effectiveness of Pretreatment Control Efforts



Contact us:

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Wastewater Quality Process Analyst

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Shane Sinclair

Industrial Pre-Treatment Manager

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ARS Aleut Analytical

ARS International, LLC Laboratory Analysis Report

ARSI-18-00516

USACE COC #72

Prepared for:

Seattle USACE

Marlowe Laubach/Ember Korver/Karah Haskins

4735 East Marginal Way South

Seattle, WA 98134

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Phone: 206-764-4480

Project Manager Review

Notes: ARS International, LLC assumes no liability for the use or the interpretation of any analytical results provided other than the cost of the analysis itself. Reproduction of this report in less than full requires the written consent of the client.

Contact Person: Questions regarding this analytical report should be addressed to:

Project Manager

ProjectManagers@amrad.com Phone: 225.381.2991

Fax: 225.381.2996



LELAP cert# 01949



March 7, 2018

Ember Korver
Karah Haskins
USACE-Seattle
206-764-4480
ember.e.korver@usace.army.mil
karah.a.haskins@usace.army.mil

ARS SDG: **ARS1-18-00516**
Task Order: **3**
USACE COC: **#72**

Dear Ember & Karah,

On February 20, 2018, JBLM submitted six (6) samples to be analyzed for Metals, TPH-DRO, TPH-GRO, Total Recoverable Phenolics, and Cyanide, which were subcontracted to TestAmerica Laboratories. The samples were also subcontracted to GEL Laboratories for analysis of Low Level Mercury and Vista Analytical Laboratory for analysis of PBDE Congeners. Results of all the analyses are attached in the data package from the subcontracted lab.

If you have any questions, please do not hesitate to call at 255.381.2991 or email ProjectManagers@amrad.com.

Sincerely,

A handwritten signature in blue ink that reads "Susan Leese". The signature is fluid and cursive.

Susan Leese
Project Management
ARS International

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

TestAmerica Job ID: 580-75225-1

Client Project/Site: COC # 72/JBLM WWTP

For:

ARS International, LLC
2609 North River Road
Port Allen, Louisiana 70767

Attn: Susan Leese



Authorized for release by:
3/6/2018 9:46:56 AM

Kayse Zalmi, Project Manager I
(253)922-2310
kayse.zalmi@testamericainc.com

LINKS

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results through
TotalAccess

Have a Question?



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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: ARS International, LLC
Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Job ID: 580-75225-1

Laboratory: TestAmerica Seattle

Narrative

Job Narrative 580-75225-1

Receipt

The samples were received on 2/20/2018 4:10 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.1° C.

Receipt Exceptions

A trip blank was submitted for analysis with these samples; however, it was not listed on the Chain of Custody (COC).

GC/MS VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC Semi VOA

Method(s) NWTPH-Dx: Continuing calibration verification (CCV) standard associated with batch 580-268152 recovered outside %Drift acceptance criteria for o-Terphenyl surrogate. The %Recovery is within acceptance criteria for the surrogate in the CCV and associated samples; therefore, the data are qualified and reported. The following samples are affected: Effluent Grab 1 (580-75225-5), (CCV 580-268152/14), (CCV 580-268152/25) and (CCVRT 580-268152/3).

Method(s) NWTPH-Dx: The following sample contained a hydrocarbon pattern in the diesel range; however, the elution pattern was later than the typical diesel fuel pattern used by the laboratory for quantitative purposes: Effluent Grab 1 (580-75225-5).

Method(s) NWTPH-Dx: The peak profile present in this sample Influent Grab 1 (580-75225-2) is atypical of a hydrocarbon pattern and consists of discrete peaks.

Method(s) NWTPH-Dx: The following sample was diluted to bring the concentration of target analytes within the calibration range: Influent Grab 1 (580-75225-2). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: ARS International, LLC
Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: ARS International, LLC
 Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Client Sample ID: Influent Composite

Lab Sample ID: 580-75225-1

Date Collected: 02/19/18 11:20

Matrix: Water

Date Received: 02/20/18 16:10

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		02/23/18 09:25	02/26/18 16:19	1
Cadmium	ND		0.00040		mg/L		02/23/18 09:25	02/26/18 16:19	1
Chromium	0.00084		0.00040		mg/L		02/23/18 09:25	02/26/18 16:19	1
Copper	0.050		0.0020		mg/L		02/23/18 09:25	02/26/18 16:19	1
Lead	ND		0.00080		mg/L		02/23/18 09:25	02/26/18 16:19	1
Molybdenum	ND		0.00080		mg/L		02/23/18 09:25	02/26/18 16:19	1
Nickel	ND		0.0030		mg/L		02/23/18 09:25	02/26/18 16:19	1
Selenium	ND		0.0080		mg/L		02/23/18 09:25	02/26/18 16:19	1
Silver	ND		0.00040		mg/L		02/23/18 09:25	02/26/18 16:19	1
Zinc	0.057		0.0070		mg/L		02/23/18 09:25	02/26/18 16:19	1

Client Sample Results

Client: ARS International, LLC
 Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Client Sample ID: Influent Grab 1

Date Collected: 02/19/18 16:05

Date Received: 02/20/18 16:10

Lab Sample ID: 580-75225-2

Matrix: Water

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25		mg/L			02/23/18 19:53	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	86		58 - 133					02/23/18 19:53	1
Trifluorotoluene (Surr)	120		77 - 128					02/23/18 19:53	1

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	5.1		0.55		mg/L		02/28/18 09:43	03/05/18 13:04	5
Motor Oil (>C24-C36)	5.4		1.8		mg/L		02/28/18 09:43	03/05/18 13:04	5
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	51		50 - 150				02/28/18 09:43	03/05/18 13:04	5

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	ND		0.050		mg/L		02/27/18 16:38	03/01/18 15:28	1
Cyanide, Total	ND		0.060		mg/L		02/22/18 11:49	02/22/18 15:20	1

Client Sample Results

Client: ARS International, LLC
Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Client Sample ID: Influent Grab 2

Lab Sample ID: 580-75225-3

Date Collected: 02/19/18 17:10

Matrix: Water

Date Received: 02/20/18 16:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	ND		0.050		mg/L		02/27/18 16:38	03/01/18 15:29	1
Cyanide, Total	ND		0.060		mg/L		02/22/18 11:49	02/22/18 15:20	1

Client Sample Results

Client: ARS International, LLC
 Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Client Sample ID: Effluent Composite

Lab Sample ID: 580-75225-4

Date Collected: 02/19/18 11:15

Matrix: Water

Date Received: 02/20/18 16:10

Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		02/23/18 09:25	02/26/18 16:23	1
Cadmium	ND		0.00040		mg/L		02/23/18 09:25	02/26/18 16:23	1
Chromium	ND		0.00040		mg/L		02/23/18 09:25	02/26/18 16:23	1
Copper	0.017		0.0020		mg/L		02/23/18 09:25	02/26/18 16:23	1
Lead	ND		0.00080		mg/L		02/23/18 09:25	02/26/18 16:23	1
Molybdenum	ND		0.00080		mg/L		02/23/18 09:25	02/26/18 16:23	1
Nickel	ND		0.0030		mg/L		02/23/18 09:25	02/26/18 16:23	1
Selenium	ND		0.0080		mg/L		02/23/18 09:25	02/26/18 16:23	1
Silver	ND		0.00040		mg/L		02/23/18 09:25	02/26/18 16:23	1
Zinc	0.029		0.0070		mg/L		02/23/18 09:25	02/26/18 16:23	1

Client Sample Results

Client: ARS International, LLC
 Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Client Sample ID: Effluent Grab 1

Lab Sample ID: 580-75225-5

Date Collected: 02/19/18 16:10

Matrix: Water

Date Received: 02/20/18 16:10

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25		mg/L			02/23/18 20:55	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	85		58 - 133					02/23/18 20:55	1
Trifluorotoluene (Surr)	122		77 - 128					02/23/18 20:55	1

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	0.26		0.11		mg/L		02/28/18 09:43	03/01/18 03:44	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		02/28/18 09:43	03/01/18 03:44	1
Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	63		50 - 150				02/28/18 09:43	03/01/18 03:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	ND		0.050		mg/L		02/27/18 16:38	03/01/18 15:31	1
Cyanide, Total	ND		0.060		mg/L		02/22/18 11:49	02/22/18 15:20	1

Client Sample Results

Client: ARS International, LLC
Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Client Sample ID: Effluent Grab 2

Lab Sample ID: 580-75225-6

Date Collected: 02/19/18 17:15

Matrix: Water

Date Received: 02/20/18 16:10

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	ND		0.050		mg/L		02/27/18 16:38	03/01/18 15:48	1
Cyanide, Total	ND		0.060		mg/L		02/22/18 11:49	02/22/18 15:20	1

QC Sample Results

Client: ARS International, LLC
 Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Method: NWTPH-Gx - Northwest - Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-267913/6
Matrix: Water
Analysis Batch: 267913

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline	ND		0.25		mg/L			02/23/18 14:40	1
Surrogate	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	87		58 - 133					02/23/18 14:40	1
Trifluorotoluene (Surr)	110		77 - 128					02/23/18 14:40	1

Lab Sample ID: LCS 580-267913/7
Matrix: Water
Analysis Batch: 267913

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline	1.00	0.905		mg/L		90	79 - 110
Surrogate	%Recovery	LCS Qualifier	Limits				
4-Bromofluorobenzene (Surr)	89		58 - 133				
Trifluorotoluene (Surr)	99		77 - 128				

Lab Sample ID: LCSD 580-267913/8
Matrix: Water
Analysis Batch: 267913

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline	1.00	0.954		mg/L		95	79 - 110	5	10
Surrogate	%Recovery	LCSD Qualifier	Limits						
4-Bromofluorobenzene (Surr)	91		58 - 133						
Trifluorotoluene (Surr)	102		77 - 128						

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC)

Lab Sample ID: MB 580-268098/1-A
Matrix: Water
Analysis Batch: 268257

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 268098

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
#2 Diesel (C10-C24)	ND		0.11		mg/L		02/28/18 09:43	03/02/18 20:46	1
Motor Oil (>C24-C36)	ND		0.35		mg/L		02/28/18 09:43	03/02/18 20:46	1
Surrogate	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	68		50 - 150				02/28/18 09:43	03/02/18 20:46	1

Lab Sample ID: LCS 580-268098/2-A
Matrix: Water
Analysis Batch: 268257

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 268098

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
#2 Diesel (C10-C24)	2.00	1.60		mg/L		80	59 - 112

TestAmerica Seattle

QC Sample Results

Client: ARS International, LLC
 Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Method: NWTPH-Dx - Northwest - Semi-Volatile Petroleum Products (GC) (Continued)

Lab Sample ID: LCS 580-268098/2-A
Matrix: Water
Analysis Batch: 268257

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 268098

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Motor Oil (>C24-C36)	2.00	1.81		mg/L		90	64 - 120
Surrogate	%Recovery	LCS Qualifier	Limits				
<i>o</i> -Terphenyl	83		50 - 150				

Lab Sample ID: LCSD 580-268098/3-A
Matrix: Water
Analysis Batch: 268257

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 268098

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
#2 Diesel (C10-C24)	2.00	1.63		mg/L		82	59 - 112	2	16
Motor Oil (>C24-C36)	2.00	1.84		mg/L		92	64 - 120	2	17
Surrogate	%Recovery	LCSD Qualifier	Limits						
<i>o</i> -Terphenyl	84		50 - 150						

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 580-267859/14-A
Matrix: Water
Analysis Batch: 268009

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 267859

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010		mg/L		02/23/18 09:25	02/26/18 15:29	1
Cadmium	ND		0.00040		mg/L		02/23/18 09:25	02/26/18 15:29	1
Chromium	ND		0.00040		mg/L		02/23/18 09:25	02/26/18 15:29	1
Copper	ND		0.0020		mg/L		02/23/18 09:25	02/26/18 15:29	1
Lead	ND		0.00080		mg/L		02/23/18 09:25	02/26/18 15:29	1
Molybdenum	ND		0.00080		mg/L		02/23/18 09:25	02/26/18 15:29	1
Nickel	ND		0.0030		mg/L		02/23/18 09:25	02/26/18 15:29	1
Selenium	ND		0.0080		mg/L		02/23/18 09:25	02/26/18 15:29	1
Silver	ND		0.00040		mg/L		02/23/18 09:25	02/26/18 15:29	1
Zinc	ND		0.0070		mg/L		02/23/18 09:25	02/26/18 15:29	1

Lab Sample ID: LCS 580-267859/15-A
Matrix: Water
Analysis Batch: 268009

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 267859

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.101		mg/L		101	85 - 115
Cadmium	0.100	0.0986		mg/L		99	85 - 115
Chromium	0.100	0.0991		mg/L		99	85 - 115
Copper	0.100	0.0985		mg/L		98	85 - 115
Lead	0.100	0.0997		mg/L		100	85 - 115
Molybdenum	0.100	0.0984		mg/L		98	85 - 115
Nickel	0.100	0.0964		mg/L		96	85 - 115
Selenium	0.100	0.0952		mg/L		95	85 - 115
Silver	0.100	0.101		mg/L		101	85 - 115

TestAmerica Seattle

QC Sample Results

Client: ARS International, LLC
 Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 580-267859/15-A
Matrix: Water
Analysis Batch: 268009

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 267859

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Zinc	0.100	0.0984		mg/L		98	85 - 115

Lab Sample ID: LCSD 580-267859/16-A
Matrix: Water
Analysis Batch: 268009

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 267859

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	0.100	0.0985		mg/L		98	85 - 115	3	20
Cadmium	0.100	0.0949		mg/L		95	85 - 115	4	20
Chromium	0.100	0.0961		mg/L		96	85 - 115	3	20
Copper	0.100	0.0945		mg/L		94	85 - 115	4	20
Lead	0.100	0.0958		mg/L		96	85 - 115	4	20
Molybdenum	0.100	0.0960		mg/L		96	85 - 115	2	20
Nickel	0.100	0.0927		mg/L		93	85 - 115	4	20
Selenium	0.100	0.0915		mg/L		92	85 - 115	4	20
Silver	0.100	0.0970		mg/L		97	85 - 115	4	20
Zinc	0.100	0.0957		mg/L		96	85 - 115	3	20

Method: 420.4 - Phenolics, Total Recoverable

Lab Sample ID: MB 490-498179/1-A
Matrix: Water
Analysis Batch: 498792

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 498179

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenolics, Total Recoverable	ND		0.050		mg/L		02/27/18 16:38	03/01/18 15:19	1

Lab Sample ID: LCS 490-498179/2-A
Matrix: Water
Analysis Batch: 498792

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 498179

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Phenolics, Total Recoverable	0.760	0.720		mg/L		95	90 - 110

Method: SM 4500 CN E - Cyanide, Total

Lab Sample ID: MB 580-267814/1-A
Matrix: Water
Analysis Batch: 267836

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 267814

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cyanide, Total	ND		0.060		mg/L		02/22/18 11:49	02/22/18 15:20	1

Lab Sample ID: LCS 580-267814/2-A
Matrix: Water
Analysis Batch: 267836

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 267814

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Cyanide, Total	0.500	0.481		mg/L		96	90 - 110

TestAmerica Seattle

QC Sample Results

Client: ARS International, LLC
 Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Lab Sample ID: LCSD 580-267814/3-A
Matrix: Water
Analysis Batch: 267836

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 267814

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Cyanide, Total	0.500	0.504		mg/L		101	90 - 110	5	10

Lab Sample ID: 580-75225-2 MS
Matrix: Water
Analysis Batch: 267836

Client Sample ID: Influent Grab 1
Prep Type: Total/NA
Prep Batch: 267814

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Cyanide, Total	ND		0.500	0.463		mg/L		93	90 - 110		

Lab Sample ID: 580-75225-2 MSD
Matrix: Water
Analysis Batch: 267836

Client Sample ID: Influent Grab 1
Prep Type: Total/NA
Prep Batch: 267814

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Cyanide, Total	ND		0.500	0.455		mg/L		91	90 - 110	2	10

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

Lab Chronicle

Client: ARS International, LLC
 Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Client Sample ID: Influent Composite

Lab Sample ID: 580-75225-1

Date Collected: 02/19/18 11:20

Matrix: Water

Date Received: 02/20/18 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.8			267859	02/23/18 09:25	ASJ	TAL SEA
Total/NA	Analysis	200.8		1	268009	02/26/18 16:19	FCW	TAL SEA

Client Sample ID: Influent Grab 1

Lab Sample ID: 580-75225-2

Date Collected: 02/19/18 16:05

Matrix: Water

Date Received: 02/20/18 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	NWTPH-Gx		1	267913	02/23/18 19:53	JCV	TAL SEA
Total/NA	Prep	3510C			268098	02/28/18 09:43	NDB	TAL SEA
Total/NA	Analysis	NWTPH-Dx		5	268301	03/05/18 13:04	ADB	TAL SEA
Total/NA	Prep	Distill/Phenol			498179	02/27/18 16:38	RSB	TAL NSH
Total/NA	Analysis	420.4		1	498792	03/01/18 15:28	SDL	TAL NSH
Total/NA	Prep	Distill/CN			267814	02/22/18 11:49	SPP	TAL SEA
Total/NA	Analysis	SM 4500 CN E		1	267836	02/22/18 15:20	SPP	TAL SEA

Client Sample ID: Influent Grab 2

Lab Sample ID: 580-75225-3

Date Collected: 02/19/18 17:10

Matrix: Water

Date Received: 02/20/18 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Distill/Phenol			498179	02/27/18 16:38	RSB	TAL NSH
Total/NA	Analysis	420.4		1	498792	03/01/18 15:29	SDL	TAL NSH
Total/NA	Prep	Distill/CN			267814	02/22/18 11:49	SPP	TAL SEA
Total/NA	Analysis	SM 4500 CN E		1	267836	02/22/18 15:20	SPP	TAL SEA

Client Sample ID: Effluent Composite

Lab Sample ID: 580-75225-4

Date Collected: 02/19/18 11:15

Matrix: Water

Date Received: 02/20/18 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	200.8			267859	02/23/18 09:25	ASJ	TAL SEA
Total/NA	Analysis	200.8		1	268009	02/26/18 16:23	FCW	TAL SEA

Client Sample ID: Effluent Grab 1

Lab Sample ID: 580-75225-5

Date Collected: 02/19/18 16:10

Matrix: Water

Date Received: 02/20/18 16:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	NWTPH-Gx		1	267913	02/23/18 20:55	JCV	TAL SEA
Total/NA	Prep	3510C			268098	02/28/18 09:43	NDB	TAL SEA
Total/NA	Analysis	NWTPH-Dx		1	268152	03/01/18 03:44	ADB	TAL SEA

TestAmerica Seattle

Lab Chronicle

Client: ARS International, LLC
 Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Client Sample ID: Effluent Grab 1

Date Collected: 02/19/18 16:10

Date Received: 02/20/18 16:10

Lab Sample ID: 580-75225-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Distill/Phenol			498179	02/27/18 16:38	RSB	TAL NSH
Total/NA	Analysis	420.4		1	498792	03/01/18 15:31	SDL	TAL NSH
Total/NA	Prep	Distill/CN			267814	02/22/18 11:49	SPP	TAL SEA
Total/NA	Analysis	SM 4500 CN E		1	267836	02/22/18 15:20	SPP	TAL SEA

Client Sample ID: Effluent Grab 2

Date Collected: 02/19/18 17:15

Date Received: 02/20/18 16:10

Lab Sample ID: 580-75225-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	Distill/Phenol			498179	02/27/18 16:38	RSB	TAL NSH
Total/NA	Analysis	420.4		1	498792	03/01/18 15:48	SDL	TAL NSH
Total/NA	Prep	Distill/CN			267814	02/22/18 11:49	SPP	TAL SEA
Total/NA	Analysis	SM 4500 CN E		1	267836	02/22/18 15:20	SPP	TAL SEA

Laboratory References:

TAL NSH = TestAmerica Nashville, 2960 Foster Creighton Drive, Nashville, TN 37204, TEL (615)726-0177

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: ARS International, LLC
Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Laboratory: TestAmerica Seattle

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-024	01-19-19
ANAB	DoD ELAP		L2236	01-19-19
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	11-05-18
Montana (UST)	State Program	8	N/A	04-30-20
Oregon	NELAP	10	WA100007	11-05-18
US Fish & Wildlife	Federal		LE058448-0	10-31-18
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

Laboratory: TestAmerica Nashville

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
A2LA	A2LA		NA: NELAP & A2LA	12-31-19
A2LA	ISO/IEC 17025		0453.07	12-31-19
Alaska (UST)	State Program	10	UST-087	06-30-18
Arizona	State Program	9	AZ0473	05-05-18
Arkansas DEQ	State Program	6	88-0737	04-25-18
California	State Program	9	2938	10-31-18
Connecticut	State Program	1	PH-0220	12-31-19
Florida	NELAP	4	E87358	06-30-18
Georgia	State Program	4	E87358(FL)/453.07(A2L A)	06-30-18
Illinois	NELAP	5	200010	12-09-18
Iowa	State Program	7	131	04-01-18
Kansas	NELAP	7	E-10229	10-31-18
Kentucky (UST)	State Program	4	19	06-30-18
Kentucky (WW)	State Program	4	90038	12-31-18
Louisiana	NELAP	6	30613	06-30-18
Maine	State Program	1	TN00032	11-03-19
Maryland	State Program	3	316	03-31-19
Massachusetts	State Program	1	M-TN032	06-30-18
Minnesota	NELAP	5	047-999-345	12-31-18
Mississippi	State Program	4	N/A	06-30-18
Montana (UST)	State Program	8	NA	02-24-20
Nevada	State Program	9	TN00032	07-31-18
New Hampshire	NELAP	1	2963	10-09-18
New Jersey	NELAP	2	TN965	06-30-18
New York	NELAP	2	11342	03-31-18
North Carolina (WW/SW)	State Program	4	387	12-31-18
North Dakota	State Program	8	R-146	06-30-18
Ohio VAP	State Program	5	CL0033	07-06-19
Oklahoma	State Program	6	9412	08-31-18
Oregon	NELAP	10	TN200001	04-27-18
Pennsylvania	NELAP	3	68-00585	06-30-18
Rhode Island	State Program	1	LAO00268	12-30-17 *
South Carolina	State Program	4	84009 (001)	02-28-18 *
Tennessee	State Program	4	2008	02-23-20
Texas	NELAP	6	T104704077	08-31-18
USDA	Federal		P330-13-00306	12-01-19

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

TestAmerica Seattle

Accreditation/Certification Summary

Client: ARS International, LLC
Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Laboratory: TestAmerica Nashville (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Utah	NELAP	8	TN00032	07-31-18
Virginia	NELAP	3	460152	06-14-18
Washington	State Program	10	C789	07-19-18
West Virginia DEP	State Program	3	219	02-28-19
Wisconsin	State Program	5	998020430	08-31-18
Wyoming (UST)	A2LA	8	453.07	12-31-19

Sample Summary

Client: ARS International, LLC
Project/Site: COC # 72/JBLM WWTP

TestAmerica Job ID: 580-75225-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-75225-1	Influent Composite	Water	02/19/18 11:20	02/20/18 16:10
580-75225-2	Influent Grab 1	Water	02/19/18 16:05	02/20/18 16:10
580-75225-3	Influent Grab 2	Water	02/19/18 17:10	02/20/18 16:10
580-75225-4	Effluent Composite	Water	02/19/18 11:15	02/20/18 16:10
580-75225-5	Effluent Grab 1	Water	02/19/18 16:10	02/20/18 16:10
580-75225-6	Effluent Grab 2	Water	02/19/18 17:15	02/20/18 16:10

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- 11

Loc: 580
75225



Chain of Custody Record

Client Contact: USACE Marlowe Laubach
 Phone#: (206) 764-4480
 Contract #: W912DW-17-D-1012
 Task Order#: W912DW18FS005

Program/Samplers Name: JBLM-WWTP
 Address: 2012 Liggett Ave
JBLM, WA 98433
 Phone# 253-966-1768 (Cindy Trout)
 Cell # 253-967-2837 (Becky Kowalski)
 Email: usarmy.jblm.imcom.list.dpw-wwtp@mail.mil

Lab Sent To: Test America-Seattle/Tacoma
 Contact: Kathy Kreps (Kathy.kreps@testamericainc.com)
 Address: 5755 8th Street East
Tacoma, WA 98424
 Phone: 253.248.4964
 Cell: 253.380.6574

Lab performing analysis				Analytical Method and Preparation/Extraction Procedure							Turnaround Time (business days):		
Date	Time	Sample ID	Type *	# of Cont	[0004M] Cyanide, Total	[0004AK] Phenolics, Manual Distillation	[0003B] GRO NWTPH-GX	[0009F] DRO NWTPH-DX	[0005P] Mercury, Cold Vapor, low level (20 ng/L)	[0005B] *Metals		[0007T] **PBDE Congeners (SW8082)	
2/19/18	11:20	Influent Composite	AQ	4					X	X	X	NOT USED	Notes/Special Instructions: *Metals - As, Cd, Cr, Cu, Mo, Ni, Pb, Se, Ag, Zn **PBDE Congeners - 15, 28/33, 46, 47, 66, 57, 99, 100, 119, 153, 154, 155, 209
2/19/18	16:05	Influent Grab 1	AQ	7	X	X	X	X					
2/19/18	17:10	Influent Grab 2	AQ	2	X	X							
2/19/18	11:15	Effluent Composite	AQ	4					X	X	X		
2/19/18	16:10	Effluent Grab 1	AQ	7	X	X	X	X					
2/19/18	17:15	Effluent Grab 2	AQ	2	X	X							
//////////////////////////////////// - NOTHING AUTHORIZED BELOW THIS LINE - //////////////////////////////////////													
7													Send Results To: JBLM, usarmy.jblm.imcom.list.dpw-wwtp@mail.mil Susan Leese, ARS, sleese@amrad.com Karah Haskins, USACE, karah.a.haskins@usace.army.mil Ember Korver, USACE, Ember.E.Korver@usace.army.mil Marlowe Laubach, USACE, Marlowe.D.Laubach@usace.army.mil
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

Possible Hazard Identification:
 Low-Level Contaminants Skin Irritant Unknown
 Sample Disposal Options:
 Disposal By Lab Archive For _____ Months

Additional Notes: 2018.01.01 Solo Point WWTP Quarterly

FEDEX TRACKING#: _____

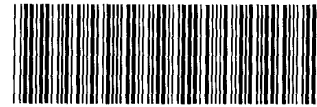
Relinquished by: (signature)	Date/Time
<i>[Signature]</i>	2/20/18

Received by: (signature)	Date/Time
<i>[Signature]</i>	2-26-18

* Types of samples: S - solids, AQ - aqueous, DW - drinking water, SM - smear, LT - leak test, AF - air filters, SI - Silica gel, VG - vegetation, BIO - Bioassay

Therm. ID A2 Cor. 1.1 Unc 2.0
 Cooler Dsc: Log Blue
 Wet/Packs Packing: bubble
 CI: do Custody Seal: Yes No





COOLER RECEIPT FOR

Cooler Received/Opened On 2/22/2018 @ 10:15

Time Samples Removed From Cooler _____ Time Samples Placed In Storage _____ (2 Hour Window)

1. Tracking # 7536 (last 4 digits, FedEx) Courier: FedEx
IR Gun ID 97310166 pH Strip Lot _____ Chlorine Strip Lot _____

2. Temperature of rep. sample or temp blank when opened: 3.5 Degrees Celsius

3. If Item #2 temperature is 0°C or less, was the representative sample or temp blank frozen? YES NO NA

4. Were custody seals on outside of cooler? YES...NO...NA None
If yes, how many and where: _____

5. Were the seals intact, signed, and dated correctly? YES...NO...NA

6. Were custody papers inside cooler? YES...NO...NA

I certify that I opened the cooler and answered questions 1-6 (initial) es

7. Were custody seals on containers: YES NO and Intact YES...NO...NA
Were these signed and dated correctly? YES...NO...NA

8. Packing mat'l used? Bubblewrap Plastic bag Peanuts Vermiculite Foam Insert Paper Other None

9. Cooling process: Ice Ice-pack Ice (direct contact) Dry ice Other None

10. Did all containers arrive in good condition (unbroken)? YES...NO...NA

11. Were all container labels complete (#, date, signed, pres., etc)? YES...NO...NA

12. Did all container labels and tags agree with custody papers? YES...NO...NA

13a. Were VOA vials received? YES NO...NA

b. Was there any observable headspace present in any VOA vial? YES...NO...NA



14. Was there a Trip Blank in this cooler? YES...NO...NA If multiple coolers, sequence # _____

I certify that I unloaded the cooler and answered questions 7-14 (initial) es

15a. On pres'd bottles, did pH test strips suggest preservation reached the correct pH level? YES...NO...NA

b. Did the bottle labels indicate that the correct preservatives were used YES...NO...NA

16. Was residual chlorine present? YES...NO...NA

I certify that I checked for chlorine and pH as per SOP and answered questions 15-16 (initial) es

17. Were custody papers properly filled out (ink, signed, etc)? YES...NO...NA

18. Did you sign the custody papers in the appropriate place? YES...NO...NA

19. Were correct containers used for the analysis requested? YES...NO...NA

20. Was sufficient amount of sample sent in each container? YES...NO...NA

I certify that I entered this project into LIMS and answered questions 17-20 (initial) es

I certify that I attached a label with the unique LIMS number to each container (initial) es

21. Were there Non-Conformance issues at login? YES NO Was a NCM generated? YES...NO...# es

TestAmerica Seattle
 5755 8th Street East
 Tacoma, WA 98424
 Phone (253) 922-2310 Fax (253) 922-5047

Chain of Custody Record

580-75225

TestAmerica
 DER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab) Client Contact: Zalmal, Kayse 1 Shipping/Receiving: kayse.zalmal@testamericainc.com State of Origin: Washington Company: TestAmerica Laboratories, Inc Address: 2960 Foster Creighton Drive, Nashville, TN, 37204 Phone: 615-726-0177 (Tel) 615-726-3404 (Fax) Email: Project Name: Seattle Army Corp of Engineers Task III Site:		Lab PM: Zalmal, Kayse 1 E-Mail: kayse.zalmal@testamericainc.com State of Origin: Washington Accreditations Required (See note): Due Date Requested: 3/2/2018 TAT Requested (days): PO #: 58012000 W/O #: Project #: 58012000 SOW #:			
Analysis Requested 420.4 Distill Phenol Total Recoverable Phenolics Field Filtered Sample (Yes or No) <input checked="" type="checkbox"/> X Matrix (Water, Seawater, Overstabil, Inorganic Acid) Water		Preservation Codes: A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Amchlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other: M - Hexane N - None O - AsNaO2 P - Na2CO4S Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecahydrate U - Acetone V - MCAA W - pH 4.5 Z - other (specify)			
Sample Identification - Client ID (Lab ID) Influent Grab 1 (580-75225-1-2) Influent Grab 2 (580-75225-1) Effluent Grab 1 (580-75225-5) Effluent Grab 2 (580-75225-6)	Sample Date 2/19/18 2/19/18 2/19/18 2/19/18	Sample Time 16:05 Pacific 17:10 Pacific 16:10 Pacific 17:15 Pacific	Sample Type (C=Comp, G=grab) 	Total Number of Containers 1 1 1 1	Special Instructions/Note:
Possible Hazard Identification Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2		Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months			
Relinquished by: <i>Kayse Zalmal</i> Relinquished by: _____ Relinquished by: _____		Date: 2-21-18 12:45 Date Time: _____ Date Time: _____			
Relinquished by: _____ Date: _____ Date Time: _____		Date: 2-22-18 10:15 Date Time: _____ Date Time: _____			
Custody Seals Intact: <input type="checkbox"/> Yes <input type="checkbox"/> No Cooler Temperature(s) °C and Other Remarks: 3/5		Company: <i>TestAmerica</i> Company: _____ Company: _____			



Login Sample Receipt Checklist

Client: ARS International, LLC

Job Number: 580-75225-1

Login Number: 75225

List Source: TestAmerica Seattle

List Number: 1

Creator: Gall, Brandon A

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Received Trip Blank(s) not listed on COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



March 06, 2018

Ms. Susan Leese
ARS International, LLC
2609 North River Road
Port Allen, Louisiana 70767

Re: JBLM - Pretreatment
Work Order: 444796

Dear Ms. Leese:

GEL Laboratories, LLC (GEL) appreciates the opportunity to provide the enclosed analytical results for the sample(s) we received on February 28, 2018. This original data report has been prepared and reviewed in accordance with GEL's standard operating procedures.

Our policy is to provide high quality, personalized analytical services to enable you to meet your analytical needs on time every time. We trust that you will find everything in order and to your satisfaction. If you have any questions, please do not hesitate to call me at (843) 556-8171, ext. 4485.

Sincerely,

Valerie Davis
Project Manager

Purchase Order: USACE COC 72
Chain of Custody: 72
Enclosures

Case Narrative

**Receipt Narrative
for
ARS International
SDG: 444796**

March 06, 2018

Laboratory Identification:

GEL Laboratories LLC
2040 Savage Road
Charleston, South Carolina 29407
(843) 556-8171

Summary:

Sample receipt: The samples arrived at GEL Laboratories LLC, Charleston, South Carolina on February 28, 2018 for analysis. The samples were delivered with proper chain of custody documentation and signatures. All sample containers arrived without any visible signs of tampering or breakage. There are no additional comments concerning sample receipt.

Sample Identification: The laboratory received the following samples:

<u>Laboratory ID</u>	<u>Client ID</u>
444796001	Influent Composite
444796002	Effluent Composite

Case Narrative:

Sample analyses were conducted using methodology as outlined in GEL's Standard Operating Procedures. Any technical or administrative problems during analysis, data review, and reduction are contained in the analytical case narratives in the enclosed data package.

The enclosed data package contains the following sections: Case Narrative, Chain of Custody, Cooler Receipt Checklist, Data Package Qualifier Definitions and data from the following fractions: Metals.



Valerie Davis
Project Manager

Chain of Custody and Supporting Documentation

444754

Chain of Custody Record

Client Contact: USACE Marlowe Laubach
Phone#: (206) 764-4480

Contract #: W912DW-17-D-1012
Task Order#: W912DW18F5005

Program/Samplers Name: JBLM-WWTP
Address: 2012 Liggett Ave

JBLM, WA 98433
Phone# 253-966-1768 (Cindy Trout)
Cell # 253-967-2837 (Becky Kowalski)
Email: usarmy.jblm.imcom.list.dpw-wwtp@mail.mil

Lab Sent To: Test America-Seattle/Tacoma

Contact: Kathy Kreps (kathy.kreps@testamericainc.com)
Address: 5755 8th Street East
Tacoma, WA 98424
Phone: 253.248.4964
Cell: 253.380.6574

Lab performing analysis		Analytical Method and Preparation/Extraction Procedure										Turnaround Time (business days):
Date	Time	Sample ID	Type*	# of Cont	[004M] Cyanide, Total	[004A] Phenolics, Manual Distillation	[0003B] GRO NWTPH-GX	[003F] DRO NWTPH-DX	[005P] Mercury, Cold Vapor, low level (20 ng/L)	[0005B] Metals	[0007I] **PBDE Congeners (SW802)	
2/19/18	1120	Influent Composite	AQ	4	X	X	X	X	X	X	X	Notes/Special Instructions: *Metals - As, Cd, Cr, Cu, Mo, Ni, Pb, Se, Ag, Zn **PBDE Congeners - 15, 28/33, 46, 47, 66, 57, 99, 100, 119, 153, 154, 155, 209
2/19/18	1605	Influent Grab 1	AQ	7	X	X	X	X	X	X	X	
2/19/18	1710	Influent Grab 2	AQ	2	X	X	X	X	X	X	X	
2/19/18	1715	Effluent Composite	AQ	4	X	X	X	X	X	X	X	
2/19/18	1610	Effluent Grab 1	AQ	7	X	X	X	X	X	X	X	
2/19/18	1715	Effluent Grab 2	AQ	2	X	X	X	X	X	X	X	
- NOTHING AUTHORIZED BELOW THIS LINE -												
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PREPARED
Date: 2-28-18
Time: 11:37
Analyst: BCD
Biol: 20521611-BST
Volume: 5mls

Possible Hazard Identification:
 Low-Level Contaminants
 Skin Irritant
 Unknown

Sample Disposal Options:
 Disposal By Lab
 Archive For _____ Months

Additional Notes: 2018.01.01 Solo Point WWTP Quarterly

FEDEX TRACKING: _____

Date/Time	Relinquished by (signature)	Date/Time	Received by (signature)
2/20/18	[Signature]	2/20/18	[Signature]
2/23/18	[Signature]	2/23/18	[Signature]

* Types of samples: S - solids, AQ - aqueous, DW - drinking water, SM - smear, LT - leak test, AF - air filters, SI - silica gel, VG - vegetation, BIO - bioassay

Therm. ID AZ Cor. 1.1 Unc 2.0
Cooler Dsc: Log Blue
Wet/Pack Packing: Bubble
Cl: e40 Custody Seal: Yes X No

USACE COC 72
HASKINS.KARA
H.A.1303620923
Date: 2018.01.10 13:22:4 -0800

Send Results To:
JBLM, usarmy.jblm.imcom.list.dpw-wwtp@mail.mil
Susan Leese, ARS, sleese@amrad.com
Karah Haskins, USACE, karah.a.haskins@usace.army.mil
Ember Konver, USACE, Ember.E.Konver@usace.army.mil
Marlowe Laubach, USACE, Marlowe.D.Laubach@usace.army.mil



SAMPLE RECEIPT & REVIEW FORM

Client: <u>ARSI</u>	SDG/AR/COC/Work Order: <u>444796</u>
Received By: <u>Bryan Davis</u>	Date Received: <u>2-28-18</u>
Carrier and Tracking Number	Circle Applicable: FedEx Express FedEx Ground <u>UPS</u> Field Services Courier Other Tracking # <u>1Z A21 3W7 13 9721 2110</u>

Suspected Hazard Information	Yes	No	*If Net Counts > 100cpm on samples not marked "radioactive", contact the Radiation Safety Group for further investigation.
Shipped as a DOT Hazardous?		<input checked="" type="checkbox"/>	Hazard Class Shipped: _____ UN#: _____
COC/Samples marked or classified as radioactive?		<input checked="" type="checkbox"/>	Maximum Net Counts Observed* (Observed Counts - Area Background Counts): <u>0</u> CPM / mR/Hr Classified as: Rad 1 Rad 2 Rad 3
Is package, COC, and/or Samples marked HAZ?		<input checked="" type="checkbox"/>	If yes, select Hazards below, and contact the GEL Safety Group. PCB's Flammable Foreign Soil RCRA Asbestos Beryllium Other:

Sample Receipt Criteria	Yes	NA	No	Comments/Qualifiers (Required for Non-Conforming Items)
1 Shipping containers received intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
2 Chain of custody documents included with shipment?	<input checked="" type="checkbox"/>			
3 Samples requiring cold preservation within (0 ≤ 6 deg. C)?*			<input checked="" type="checkbox"/>	Preservation Method: Wet Ice Ice Packs Dry ice <u>None</u> Other: *all temperatures are recorded in Celsius TEMP: 17.3°C
4 Daily check performed and passed on IR temperature gun?	<input checked="" type="checkbox"/>			Temperature Device Serial #: LLHG001 Secondary Temperature Device Serial # (If Applicable):
5 Sample containers intact and sealed?	<input checked="" type="checkbox"/>			Circle Applicable: Seals broken Damaged container Leaking container Other (describe)
6 Samples requiring chemical preservation at proper pH?	<input checked="" type="checkbox"/>			Sample ID's and Containers Affected: If Preservation added, Lot#:
7 Do any samples require Volatile Analysis?			<input checked="" type="checkbox"/>	If Yes, Are Encores or Soil Kits present? Yes ___ No ___ (If yes, take to VOA Freezer) Do VOA vials contain acid preservation? Yes ___ No ___ N/A ___ (If unknown, select No) VOA vials free of headspace? Yes ___ No ___ N/A ___ Sample ID's and containers affected:
8 Samples received within holding time?	<input checked="" type="checkbox"/>			ID's and tests affected:
9 Sample ID's on COC match ID's on bottles?	<input checked="" type="checkbox"/>			Sample ID's and containers affected:
10 Date & time on COC match date & time on bottles?	<input checked="" type="checkbox"/>			Sample ID's affected:
11 Number of containers received match number indicated on COC?	<input checked="" type="checkbox"/>			Sample ID's affected:
12 Are sample containers identifiable as GEL provided?	<input checked="" type="checkbox"/>			
13 COC form is properly signed in relinquished/received sections?	<input checked="" type="checkbox"/>			

Comments (Use Continuation Form if needed):

PM (or PMA) review: Initials VSO Date 2/29/18 Page 1 of 1

Laboratory Certifications

List of current GEL Certifications as of 06 March 2018

State	Certification
Alaska	17-018
Arkansas	88-0651
CLIA	42D0904046
California	2940
Colorado	SC00012
Connecticut	PH-0169
Delaware	SC00012
DoD ELAP/ ISO17025 A2LA	2567.01
Florida NELAP	E87156
Foreign Soils Permit	P330-15-00283, P330-15-00253
Georgia	SC00012
Georgia SDWA	967
Hawaii	SC00012
Idaho Chemistry	SC00012
Idaho Radiochemistry	SC00012
Illinois NELAP	200029
Indiana	C-SC-01
Kansas NELAP	E-10332
Kentucky SDWA	90129
Kentucky Wastewater	90129
Louisiana NELAP	03046 (AI33904)
Louisiana SDWA	LA180011
Maryland	270
Massachusetts	M-SC012
Michigan	9976
Mississippi	SC00012
Nebraska	NE-OS-26-13
Nevada	SC000122018-1
New Hampshire NELAP	205415
New Jersey NELAP	SC002
New Mexico	SC00012
New York NELAP	11501
North Carolina	233
North Carolina SDWA	45709
North Dakota	R-158
Oklahoma	9904
Pennsylvania NELAP	68-00485
Puerto Rico	SC00012
S.Carolina Radchem	10120002
South Carolina Chemistry	10120001
Tennessee	TN 02934
Texas NELAP	T104704235-18-13
Utah NELAP	SC000122017-25
Vermont	VT87156
Virginia NELAP	460202
Washington	C780
West Virginia	997404

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 – (843) 556-8171 – www.gel.com

**Certificate of Analysis Report
for**

ARSI003 ARS International

Client SDG: 444796 GEL Work Order: 444796

The Qualifiers in this report are defined as follows:

- * A quality control analyte recovery is outside of specified acceptance criteria
- ** Analyte is a Tracer compound
- ** Analyte is a surrogate compound
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the Certificate of Analysis.

The designation ND, if present, appears in the result column when the analyte concentration is not detected above the limit as defined in the 'U' qualifier above.

This data report has been prepared and reviewed in accordance with GEL Laboratories LLC standard operating procedures. Please direct any questions to your Project Manager, Valerie Davis.



Reviewed by _____

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 6, 2018

Company : ARS International, LLC
Address : 2609 North River Road

Port Allen, Louisiana 70767
Contact: Ms. Susan Leese
Project: JBLM - Pretreatment

Client Sample ID:	Influent Composite	Project:	ARSI00118
Sample ID:	444796001	Client ID:	ARSI003
Matrix:	Water		
Collect Date:	19-FEB-18 11:20		
Receive Date:	28-FEB-18		
Collector:	Client		

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA												
EPA 1631 Low Level Mercury Analysis "As Received"												
Mercury		12.8	1.00	2.50	ng/L		5	BCD1	03/02/18	0647	1743093	1

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	EPA 1631E		

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

2040 Savage Road Charleston SC 29407 - (843) 556-8171 - www.gel.com

Certificate of Analysis

Report Date: March 6, 2018

Company : ARS International, LLC
 Address : 2609 North River Road

 Port Allen, Louisiana 70767
 Contact: Ms. Susan Leese
 Project: JBLM - Pretreatment

Client Sample ID: Effluent Composite	Project: ARSI00118
Sample ID: 444796002	Client ID: ARSI003
Matrix: Water	
Collect Date: 19-FEB-18 11:15	
Receive Date: 28-FEB-18	
Collector: Client	

Parameter	Qualifier	Result	DL	RL	Units	PF	DF	Analyst	Date	Time	Batch	Method
Mercury Analysis-CVAA												
EPA 1631 Low Level Mercury Analysis "As Received"												
Mercury		6.91	0.200	0.500	ng/L		1	BCD1	03/02/18	0640	1743093	1

The following Analytical Methods were performed:

Method	Description	Analyst	Comments
1	EPA 1631E		

Notes:

Column headers are defined as follows:

DF: Dilution Factor	Lc/LC: Critical Level
DL: Detection Limit	PF: Prep Factor
MDA: Minimum Detectable Activity	RL: Reporting Limit
MDC: Minimum Detectable Concentration	SQL: Sample Quantitation Limit

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Report Date: March 6, 2018

Page 1 of 2

ARS International, LLC
2609 North River Road
Port Allen, Louisiana

Contact: Ms. Susan Leese

Workorder: 444796

Parmname	NOM	Sample	Qual	QC	Units	RPD/D%	REC%	Range	Anlst	Date	Time
Metals Analysis-Mercury											
Batch	1743093										
QC1203980928		LCS									
Mercury	5.00			5.03	ng/L		101	(77%-123%)	BCD1	03/02/18	06:20
QC1203980927		MB									
Mercury			U	<0.2	ng/L					03/02/18	06:13
QC1203980929		444796001 MS									
Mercury	50.0	12.8		62.9	ng/L		100	(71%-125%)		03/02/18	06:54
QC1203980930		444796001 MSD									
Mercury	50.0	12.8		62.4	ng/L	0.902	99.2	(0%-24%)		03/02/18	07:01

Notes:

The Qualifiers in this report are defined as follows:

- < Result is less than value reported
- > Result is greater than value reported
- E %difference of sample and SD is >10%. Sample concentration must meet flagging criteria
- FB Mercury was found present at quantifiable concentrations in field blanks received with these samples. Data associated with the blank are deemed invalid for reporting to regulatory agencies
- H Analytical holding time was exceeded
- J Value is estimated
- N Metals--The Matrix spike sample recovery is not within specified control limits
- N/A RPD or %Recovery limits do not apply.
- NI See case narrative
- ND Analyte concentration is not detected above the detection limit
- NJ Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Q One or more quality control criteria have not been met. Refer to the applicable narrative or DER.
- R Sample results are rejected
- U Analyte was analyzed for, but not detected above the MDL, MDA, MDC or LOD.
- X Consult Case Narrative, Data Summary package, or Project Manager concerning this qualifier
- Y Other specific qualifiers were required to properly define the results. Consult case narrative.
- ^ RPD of sample and duplicate evaluated using +/-RL. Concentrations are <5X the RL. Qualifier Not Applicable for Radiochemistry.

GEL LABORATORIES LLC

2040 Savage Road Charleston, SC 29407 - (843) 556-8171 - www.gel.com

QC Summary

Workorder: 444796

Page 2 of 2

<u>Parmname</u>	<u>NOM</u>	<u>Sample</u>	<u>Qual</u>	<u>QC</u>	<u>Units</u>	<u>RPD/D%</u>	<u>REC%</u>	<u>Range</u>	<u>Anlst</u>	<u>Date</u>	<u>Time</u>
-----------------	------------	---------------	-------------	-----------	--------------	---------------	-------------	--------------	--------------	-------------	-------------

h Preparation or preservation holding time was exceeded

N/A indicates that spike recovery limits do not apply when sample concentration exceeds spike conc. by a factor of 4 or more or %RPD not applicable.
^ The Relative Percent Difference (RPD) obtained from the sample duplicate (DUP) is evaluated against the acceptance criteria when the sample is greater than five times (5X) the contract required detection limit (RL). In cases where either the sample or duplicate value is less than 5X the RL, a control limit of +/- the RL is used to evaluate the DUP result.

* Indicates that a Quality Control parameter was not within specifications.

For PS, PSD, and SDILT results, the values listed are the measured amounts, not final concentrations.

Where the analytical method has been performed under NELAP certification, the analysis has met all of the requirements of the NELAC standard unless qualified on the QC Summary.

March 02, 2018

Vista Work Order No. 1800352

Ms. Susan Leese
ARS International, LLC
2609 North River Road
Port Allen, LA 70767

Dear Ms. Leese,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on February 22, 2018. This sample set was analyzed on a rush turn-around time, under your Project Name 'USACE Region X PBDEs'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director



Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1800352

Case Narrative

Sample Condition on Receipt:

Two aqueous samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:

EPA Method 1614

These samples were extracted and analyzed for selected PBDE congeners by EPA Method 1614 using a ZB-5MS GC column.

Holding Times

The samples were extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank above the method quantitation limit. The OPR recoveries were within the method acceptance criteria.

The labeled standard recoveries outside of the method acceptance criteria are listed in the table below.

QC Anomalies

LabNumber	SampleName	Analysis	Analyte	Flag	%Rec
1800352-01	Influent Composite	EPA Method 1614	13C-BDE-15	H	154
1800352-01	Influent Composite	EPA Method 1614	13C-BDE-28	H	162
1800352-01	Influent Composite	EPA Method 1614	13C-BDE-100	H	169
1800352-01	Influent Composite	EPA Method 1614	13C-BDE-126	H	140
B8B0144-BS1	B8B0144-BS1	EPA Method 1614	13C-BDE-28	H	141

H = Recovery was outside laboratory acceptance criteria.

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1800352-01	Influent Composite	19-Feb-18 11:20	22-Feb-18 10:48	Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L
1800352-02	Effluent Composite	19-Feb-18 11:15	22-Feb-18 10:48	Amber Glass NM Bottle, 1L Amber Glass NM Bottle, 1L

ANALYTICAL RESULTS

Sample ID: Method Blank					EPA Method 1614				
Matrix: Aqueous		QC Batch: B8B0144			Lab Sample: B8B0144-BLK1				
Sample Size: 1.00 L		Date Extracted: 23-Feb-2018 7:07			Date Analyzed: 26-Feb-18 18:50 Column: ZB-5MS				
Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers	
BDE-15	ND	0.245			IS 13C-BDE-15	125	25 - 150		
BDE-28/33	ND		0.859		IS 13C-BDE-28	138	25 - 150		
BDE-75/51	ND	0.323			IS 13C-BDE-47	105	30 - 140		
BDE-47	8.88			J	IS 13C-BDE-100	123	25 - 150		
BDE-66	ND	0.555			IS 13C-BDE-99	119	25 - 150		
BDE-100	ND		1.05		IS 13C-BDE-155	104	25 - 150		
BDE-119/120	ND	1.87			IS 13C-BDE-154	99.8	25 - 150		
BDE-99	ND		4.51		IS 13C-BDE-153	101	25 - 150		
BDE-155	ND	0.680			IS 13C-BDE-209	131	20 - 200		
BDE-128/154	ND		1.10		CRS 13C-BDE-126	107	30 - 135		
BDE-153	ND		2.15						
BDE-209	ND		150						

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

Sample ID: OPR **EPA Method 1614**

Matrix: Aqueous	QC Batch: B8B0144	Lab Sample: B8B0144-BS1
Sample Size: 1.00 L	Date Extracted: 23-Feb-2018 7:07	Date Analyzed: 26-Feb-18 16:51 Column: ZB-5MS

Analyte	Amt Found (pg/L)	Spike Amt	%R	Limits	Labeled Standard	%R	LCL-UCL
BDE-15	552	500	110	50 - 150	IS 13C-BDE-15	125	30 - 140
BDE-28/33	1100	1000	110	50 - 150	IS 13C-BDE-28	141	30 - 140
BDE-75/51	2030	2000	102	50 - 150	IS 13C-BDE-47	107	30 - 140
BDE-47	1020	1000	102	50 - 150	IS 13C-BDE-100	119	30 - 140
BDE-66	1060	1000	106	50 - 150	IS 13C-BDE-99	120	30 - 140
BDE-100	1020	1000	102	50 - 150	IS 13C-BDE-155	102	30 - 140
BDE-119/120	2080	2000	104	50 - 150	IS 13C-BDE-154	99.6	30 - 140
BDE-99	1030	1000	103	50 - 150	IS 13C-BDE-153	102	30 - 140
BDE-155	1010	1000	101	50 - 150	IS 13C-BDE-209	121	20 - 200
BDE-128/154	2020	2000	101	50 - 150	CRS 13C-BDE-126	112	40 - 125
BDE-153	995	1000	99.5	50 - 150			
BDE-209	4980	5000	99.6	50 - 150			

LCL-UCL - Lower control limit - upper control limit

Sample ID: Influent Composite

EPA Method 1614

Client Data		Sample Data		Laboratory Data			
Name:	ARS International, LLC	Matrix:	Aqueous	Lab Sample:	1800352-01	Date Received:	22-Feb-2018 10:48
Project:	USACE Region X PBDEs	Sample Size:	0.976 L	QC Batch:	B8B0144	Date Extracted:	23-Feb-2018 7:07
Date Collected:	19-Feb-2018 11:20			Date Analyzed:	26-Feb-18 20:49	Column:	ZB-5MS
					26-Feb-18 23:47	Column:	ZB-5MS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
BDE-15	6.84			J	IS 13C-BDE-15	154	25 - 150	H
BDE-28/33	111				IS 13C-BDE-28	162	25 - 150	H
BDE-75/51	ND		27.7		IS 13C-BDE-47	104	30 - 140	D
BDE-47	7540			B, D	IS 13C-BDE-100	169	25 - 150	H
BDE-66	165				IS 13C-BDE-99	142	25 - 150	D
BDE-100	1530				IS 13C-BDE-155	110	25 - 150	
BDE-119/120	9.78			J	IS 13C-BDE-154	107	25 - 150	
BDE-99	7440			D	IS 13C-BDE-153	107	25 - 150	
BDE-155	21.6			J	IS 13C-BDE-209	166	20 - 200	D
BDE-128/154	579				CRS 13C-BDE-126	140	30 - 135	H
BDE-153	552							
BDE-209	37100			D				

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

Sample ID: Effluent Composite **EPA Method 1614**

Client Data	Sample Data	Laboratory Data
Name: ARS International, LLC	Matrix: Aqueous	Lab Sample: 1800352-02 Date Received: 22-Feb-2018 10:48
Project: USACE Region X PBDEs	Sample Size: 1.00 L	QC Batch: B8B0144 Date Extracted: 23-Feb-2018 7:07
Date Collected: 19-Feb-2018 11:15		Date Analyzed: 26-Feb-18 19:49 Column: ZB-5MS

Analyte	Conc. (pg/L)	DL	EMPC	Qualifiers	Labeled Standard	%R	LCL-UCL	Qualifiers
BDE-15	18.1			J	IS 13C-BDE-15	128	25 - 150	
BDE-28/33	122				IS 13C-BDE-28	144	25 - 150	
BDE-75/51	10.5			J	IS 13C-BDE-47	106	30 - 140	
BDE-47	448			B	IS 13C-BDE-100	125	25 - 150	
BDE-66	32.7			J	IS 13C-BDE-99	123	25 - 150	
BDE-100	80.1			J	IS 13C-BDE-155	102	25 - 150	
BDE-119/120	3.35			J	IS 13C-BDE-154	98.8	25 - 150	
BDE-99	316				IS 13C-BDE-153	100	25 - 150	
BDE-155	1.60			J	IS 13C-BDE-209	147	20 - 200	
BDE-128/154	34.8			J	CRS 13C-BDE-126	115	30 - 135	
BDE-153	23.5			J				
BDE-209	3890							

DL - Sample specific estimated detection limit

LCL-UCL - Lower control limit - upper control limit

EMPC - Estimated maximum possible concentration

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank.
D	Dilution
E	The associated compound concentration exceeded the calibration range of the instrument.
H	Recovery and/or RPD was outside laboratory acceptance limits.
I	Chemical Interference
J	The amount detected is below the Reporting Limit/LOQ.
M	Estimated Maximum Possible Concentration. (CA Region 2 projects only)
*	See Cover Letter
Conc.	Concentration
NA	Not applicable
ND	Not Detected
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

CERTIFICATIONS

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	17-015-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-18
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2016026
Minnesota Department of Health	1322288
New Hampshire Environmental Accreditation Program	207717
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-008
Pennsylvania Department of Environmental Protection	014
Texas Commission on Environmental Quality	T104704189-17-8
Virginia Department of General Services	9077
Washington Department of Ecology	C584
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.



Chain of Custody Record

1800352 0.20

Client Contact: USACE Marlowe Laubach
 Phone#: (206) 764-4480
 Contract #: W912DW-17-D-1012
 Task Order#: W912DW18F5005

Program/Samplers Name: JBLM-WWTP
 Address: 2012 Liggett Ave
 JBLM, WA 98433
 Phone# 253-966-1768 (Cindy Trout)
 Cell # 253-967-2837 (Becky Kowalski)
 Email: usarmy.jblm.imcom.list.dpw-wwtp@mail.mil

Lab Sent To: Test America-Seattle/Tacoma
 Contact: Kathy Kreps (Kathy.kreps@testamericainc.com)
 Address: 5755 8th Street East
 Tacoma, WA 98424
 Phone: 253.248.4964
 Cell: 253.380.6574

Lab performing analysis						Analytical Method and Preparation/Extraction Procedure						Turnaround Time (business days):	
Date	Time	Sample ID	Type *	# of Cont	[0004M] Cyanide, Total	[0004AK] Phenolics, Manual Distillation	[0003B] GRO NWTPH-Gx	[0003F] DRO NWTPH-Gx	[0005P] Mercury, Cold Vapor, low level (20 ng/L)	[0005B] *Metals	[0007T] **PBDE Congeners (SW8082)		
1	2/19/18	1120	AQ	4					X	X	X	NOT USED	Notes/Special Instructions: *Metals - As, Cd, Cr, Cu, Mo, Ni, Pb, Se, Ag, Zn **PBDE Congeners - 15, 28/33, 46, 47, 66, 57, 99, 100, 119, 153, 154, 155, 209
2	2/19/18	1605	AQ	7	X	X	X	X					
3	2/19/18	1710	AQ	2	X	X							
4	2/19/18	1115	AQ	4					X	X	X		
5	2/19/18	1610	AQ	7	X	X	X	X					
6	2/19/18	1715	AQ	2	X	X							
7 // - NOTHING AUTHORIZED BELOW THIS LINE - //////////////////////////////////////													
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14													
15													
16													
17													
18													
19													
20													

Possible Hazard Identification:
 Low-Level Contaminants Skin Irritant Unknown
 Sample Disposal Options:
 Disposal By Lab Archive For _____ Months

Additional Notes: 2018.01.01 Solo Point WWTP Quarterly

FEDEX TRACKING#: _____

Relinquished by: (signature) _____ Date/Time: 2/20/18
 B. Hall SEA TA 2:20:18

Received by: (signature) _____ Date/Time: 2/20/18
 B. Hall SEA TA 2:20:18
 B. Hall SEA TA 2/22/18 12:54

* Types of samples: S - solids, AQ - aqueous, DW - drinking water, SM - smear, LT - leak test, AF - air filters, SI - Silica gel, VG - vegetation, BIO - Bioassay

Send Results To:
 JBLM, usarmy.jblm.imcom.list.dpw-wwtp@mail.mil
 Susan Leese, ARS, sleese@amrad.com
 Karah Haskins, USACE, karah.a.haskins@usace.army.mil
 Ember Korver, USACE, Ember.E.Korver@usace.army.mil
 Marlowe Laubach, USACE, Marlowe.D.Laubach@usace.army.mil

COC NUMBER
 USACE COC 72
 HASKINS.KARA
 H.A. 1303620023
 Digitally signed by HASKINS.KARAH.A.1303620023
 DN: cn=US, o=U.S. Government, ou=ED, ou=PKL, ou=USA, email=haskins.karah.a@usace.army.mil
 Date: 2018.01.10 13:22:24 -0800

Sample Log-in Checklist

Vista Work Order #: 1800 352 TAT 12

Samples Arrival:	Date/Time <u>02/22/18</u> <u>1048</u>	Initials: <u>UBB</u>	Location: <u>WR. 2</u>
Logged In:	Date/Time <u>02/22/18</u> <u>1120</u>	Initials: <u>UBB</u>	Location: <u>WR. 2</u>
Delivered By:	FedEx <input type="checkbox"/> <u>UPS</u> <input checked="" type="checkbox"/> On Trac <input type="checkbox"/> GSO <input type="checkbox"/> DHL <input type="checkbox"/> Hand Delivered <input type="checkbox"/> Other <input type="checkbox"/>		
Preservation:	<u>Ice</u> <input checked="" type="checkbox"/> Blue Ice <input type="checkbox"/> Dry Ice <input type="checkbox"/> None <input type="checkbox"/>		
Temp °C: <u>0.2</u> (uncorrected)	Time: <u>1102</u>	Thermometer ID: DT-3	
Temp °C: <u>0.2</u> (corrected)	Probe used: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		

	YES	NO	NA
Adequate Sample Volume Received?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Airbill	Trk # <u>1ZA213W70190619270</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sample Container Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC Anomaly/Sample Acceptance Form completed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Preservation Documented:	Na ₂ S ₂ O ₃ <input type="checkbox"/> Trizma <input type="checkbox"/> None <input type="checkbox"/>	Yes <input type="checkbox"/> No <input type="checkbox"/>	<u>NA</u> <input checked="" type="checkbox"/>
Shipping Container	Vista <input type="checkbox"/> <u>Client</u> <input checked="" type="checkbox"/> Retain <input type="checkbox"/> <u>Return</u> <input checked="" type="checkbox"/> Dispose <input type="checkbox"/>		

Comments: Sample label ID's Date/time # Containers
Effluent Composite 2/19/18 1115 A/B
Influent Composite ↓ 1120 ↓

Note: COC list 6 samples only received 2 sample of the 6 listed.