



**Whole Effluent Toxicity Test Report
Birch Bay Water & Sewer**

January 2024

Report date: February 19, 2024

Submitted to:

Birch Bay Water & Sewer
7096 Point Whitehorn Road
Blaine, WA 98230

1.0 INTRODUCTION

Chronic toxicity tests were conducted using effluent samples collected from Birch Bay in January 2024. Chronic bioassays were conducted using *Americamysis bahia* (mysid shrimp) and *Atherinops affinis* (Pacific topsmelt). Testing was performed at Rainier Environmental located in Fife, Washington.

2.0 METHODS

2.1 Sample Collection and Transport

Birch Bay Water & Sewer personnel collected composite samples of effluent into LDPE cubitainers. Samples were packed in coolers containing ice and transported to Rainier Environmental. Appropriate chain-of-custody procedures were employed during collection and transport.

2.2 Sample Receipt

Upon arrival at Rainier Environmental, coolers were opened, samples inspected, and the contents verified against information on the chain-of-custody forms. Receipt temperature was measured and recorded on the chain-of-custody forms. Standard water quality parameters were measured and recorded on a sample check-in sheet (Appendix D). The samples were stored at 4°C in the dark until used for testing.

2.3 Test Methods

The chronic toxicity tests were conducted for mysid shrimp and topsmelt according to USEPA (2002) and USEPA (1995) procedures, respectively, and are summarized in Tables 1 and 2.

Table 1. Summary of methods for the mysid shrimp 7-day survival and growth test.

Test initiation date and time	1/30/2024; 1340h
Test termination date and time	2/6/2024; 1310h
Test Type	Static renewal
Endpoint	Survival and growth at 7 days
Test organism	<i>Americamysis bahia</i>
Test organism source	Aquatic BioSystems; Fort Collins, CO
Test organism age	7 days post-hatch
Feeding	<i>Artemia</i> nauplii, twice daily
Test chamber and solution volume	250 mL plastic cup
Test solution volume	200 mL
Test temperature	26 ± 1°C
Dilution water	Crystal Sea Marine Mix artificial seawater
Salinity	30 ± 2 ppt
Test concentrations (% sample)	100, 50, 12.5, 2.5, 0.77, laboratory control
Number of organisms/chamber	5
Number of replicates	8
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	EPA-821-R-02-014
Test acceptability criteria for controls	≥ 80% survival; average dry weight ≥ 0.20 mg
Reference toxicant	Copper chloride

Table 2. Summary of methods for the Pacific topsmelt 7-day survival and growth test.

Test initiation date and time	1/30/2024; 1130h
Test termination date and time	2/6/2024; 1100h
Test Type	Static renewal
Endpoint	Survival and growth at 7 days
Test organism	<i>Atherinops affinis</i>
Test organism source	Aquatic BioSystems; Fort Collins, CO
Test organism age	11 days post-hatch
Feeding	<i>Artemia</i> nauplii, twice daily
Test chamber	1-liter plastic cup
Test solution volume	500 mL
Test temperature	20 ± 1°C
Dilution water	Crystal Sea Marine Mix artificial seawater
Salinity	30 ± 2 ppt
Test concentrations (% sample)	100, 50, 12.5, 2.5, 0.77, laboratory control
Number of organisms/chamber	5
Number of replicates	5
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	EPA-600-R-95-136
Test acceptability criteria for controls	≥ 80% survival; average dry weight ≥ 0.85 mg
Reference toxicant	Copper chloride

3.0 RESULTS

Details of standard water quality measurements conducted upon receipt of samples are provided in Table 3.

Table 3. Sample information.

Sample ID		Final Effluent	
Rainier Log-In No.	24-019	24-023	24-025
Collection date and time	1/29/2024; 0900h	1/31/2024; 0800h	2/2/2024; 0800h
Receipt date and time	1/30/2024; 0940h	2/1/2024; 1230h	2/3/2024; 0925h
Receipt temperature (°C)	4.0	1.5	4.0
Dissolved oxygen (mg/L)	9.4	7.5	9.0
pH (units)	7.08	7.23	7.12
Conductivity (µS/cm)	1408	1409	1402
Salinity (ppt)	0.7	0.8	0.7
Hardness (mg/L CaCO ₃)	164	160	172
Alkalinity (mg/L CaCO ₃)	112	104	100
Total Chlorine (mg/L)	<0.03	<0.03	<0.03
Total Ammonia (mg/L)	5.3	4.4	5.0

Results for the chronic toxicity tests are summarized in Table 4. The mysid shrimp and Pacific Topsmelt tests involved a 7-day static-renewal exposure to the effluent. The endpoints for these tests were survival and growth (evaluated on the basis of dry weight divided by initial count for biomass and final count for dry weight) at the end of the 7-day exposure. In the mysid shrimp test the highest concentration with no observed effect (NOEC) was 100 percent for survival, and 50 percent for dry weight and biomass. In the Pacific Topsmelt test the highest concentration with no observed effect (NOEC) was 100 percent for survival, dry weight and biomass. No statistically significant difference was detected in the CCEC of 0.77 percent sample for any endpoint of either test.

Individual statistical summaries for all tests and copies of the laboratory bench sheets, control QC plots, sample check-in sheets, and chain of custody forms are provided in Appendices A through E.

Table 4. Summary of results for the chronic toxicity tests.

Species	Endpoint	NOEC ^a (% effluent)	LOEC ^b (% effluent)
Mysid Shrimp	Survival	100	> 100
	Biomass	50	100
	Dry weight	50	100
Topsmelt	Survival	100	>100
	Biomass	100	>100
	Dry weight	100	>100

^a No Observed Effect Concentration, ^b Lowest Observed Effect Concentration

4.0 QA/QC

The samples were received in good condition and within the temperature range specified by WDOE (2016). The toxicity tests met all acceptability criteria for performance of control organisms. There were no deviations from the protocols and water quality parameters remained within the ranges specified in the corresponding test methods throughout the tests.

Results for the reference toxicant tests used to monitor laboratory performance and test organism sensitivity are summarized in Table 7. Reference toxicant test results fell within the acceptable range of mean \pm two standard deviations of historical test results, indicating that the tests organisms were of an appropriate degree of sensitivity. The coefficients of variation (CV) for the tests are also shown in the table.

Table 5. Reference toxicant test results.

Species	Date initiated	Endpoint	LC ₅₀ /EC ₅₀	Acceptable Range	CV (%)
Mysid shrimp	1/23/2024	7d survival	228 µg/L Cu	160 – 295 µg/L Cu	16.6
		7d growth	169 µg/L Cu	128 – 255 µg/L Cu	18.7
Topsmelt	1/23/2024	7d survival	109 µg/L Cu	46.2 – 170 µg/L Cu	38.5
		7d growth	105 µg/L Cu	42.6 – 149 µg/L Cu	36.9

REFERENCES

- Tidepool Scientific Software. 2000-2007. CETIS Comprehensive Environmental Toxicity Information System Software, Version 1.6.3revG
- USEPA. 2002. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms, Third Edition. EPA-821-R-02-014. pp 214-292.
- USEPA. 1995. Short-Term Method for Estimating the Chronic Toxicity of Effluents and Receiving Waters to the West Coast Marine and Estuarine Organisms. EPA-600-R-95-136. pp 71-140.
- WDOE. 2016. Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria. Washington State Department of Ecology. Water Quality Program. Publication number: WQ-R-95-80, Revised June 2016.

Appendix A
***Americamysis bahia* (mysid shrimp) Chronic Test**
Statistical Summaries and Raw Bench Sheets

CETIS Summary Report

Report Date: 15 Feb-24 15:51 (p 1 of 2)
 Test Code: 2401-052 | 06-6661-5863

Mysidopsis 7-d Survival, Growth and Fecundity Test				Rainier Environmental Laboratory	
Batch ID:	19-4769-1056	Test Type:	Growth-Survival (7d)	Analyst:	Eric Tollefson
Start Date:	30 Jan-24 13:40	Protocol:	EPA/821/R-02-014 (2002)	Diluent:	Laboratory Seawater
Ending Date:	06 Feb-24 13:10	Species:	Mysidopsis bahia	Brine:	
Duration:	6d 23h	Source:	Aquatic Biosystems, CO	Age:	7d
Sample ID:	04-9614-8712	Code:	24-019	Client:	Birch Bay
Sample Date:	29 Jan-24 09:00	Material:	POTW Effluent	Project:	
Receive Date:	30 Jan-24 09:40	Source:	Birch Bay (WA0029556)		
Sample Age:	29h (4 °C)	Station:			

Comparison Summary							
Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
18-7567-7603	7d Survival Rate	100	>100	NA	12.2%	1	Steel Many-One Rank Sum Test
09-8131-1214	Mean Dry Biomass-mg	50	100	70.71	17.6%	2	Dunnett Multiple Comparison Test
11-0776-6142	Mean Dry Weight-mg	50	100	70.71	14.1%	2	Dunnett Multiple Comparison Test

Point Estimate Summary							
Analysis ID	Endpoint	Level	%	95% LCL	95% UCL	TU	Method
12-3998-9275	Mean Dry Biomass-mg	IC5	53.2	0.298	58.91	1.88	Linear Interpolation (ICPIN)
		IC10	61.19	0.6848	70.75	1.634	
		IC15	70.36	51.27	85.2	1.421	
		IC20	80.89	60.48	N/A	1.236	
		IC25	92.96	71.46	N/A	1.076	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	
16-3855-6147	Mean Dry Weight-mg	IC5	50.12	0.294	65.04	1.995	Linear Interpolation (ICPIN)
		IC10	62.94	0.6743	85.67	1.589	
		IC15	78.99	45.78	N/A	1.266	
		IC20	99.07	62.73	N/A	1.009	
		IC25	>100	N/A	N/A	<1	
		IC40	>100	N/A	N/A	<1	
		IC50	>100	N/A	N/A	<1	

7d Survival Rate Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	8	0.925	0.8863	0.9637	0.8	1	0.0366	0.1035	11.19%	0.0%
0.77		8	0.975	0.9486	1	0.8	1	0.025	0.07071	7.25%	-5.41%
2.5		8	0.975	0.9486	1	0.8	1	0.025	0.07071	7.25%	-5.41%
12.5		8	1	1	1	1	1	0	0	0.0%	-8.11%
50		8	0.975	0.9486	1	0.8	1	0.025	0.07071	7.25%	-5.41%
100		8	0.875	0.8066	0.9434	0.6	1	0.06478	0.1832	20.94%	5.41%

Mean Dry Biomass-mg Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	8	0.3227	0.2974	0.3481	0.234	0.424	0.02401	0.06791	21.04%	0.0%
0.77		8	0.3083	0.2924	0.3241	0.24	0.386	0.01504	0.04255	13.8%	4.49%
2.5		8	0.3255	0.3024	0.3486	0.196	0.402	0.02188	0.06189	19.01%	-0.85%
12.5		8	0.3602	0.3451	0.3754	0.272	0.394	0.01434	0.04057	11.26%	-11.62%
50		8	0.32	0.3076	0.3324	0.268	0.358	0.01172	0.03314	10.36%	0.85%
100		8	0.2382	0.2233	0.2532	0.178	0.3	0.01417	0.04008	16.82%	26.18%

Mean Dry Weight-mg Summary											
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	8	0.3472	0.3289	0.3656	0.2925	0.424	0.01741	0.04924	14.18%	0.0%
0.77		8	0.3158	0.3034	0.3281	0.29	0.386	0.01168	0.03303	10.46%	9.07%
2.5		8	0.3316	0.3136	0.3496	0.245	0.402	0.01702	0.04814	14.52%	4.5%
12.5		8	0.3602	0.3451	0.3754	0.272	0.394	0.01434	0.04057	11.26%	-3.74%
50		8	0.3301	0.3136	0.3466	0.268	0.4025	0.01563	0.04421	13.39%	4.95%
100		8	0.2771	0.2633	0.2909	0.224	0.33	0.01307	0.03697	13.34%	20.21%

CETIS Summary Report

Report Date: 15 Feb-24 15:51 (p 2 of 2)
 Test Code: 2401-052 | 06-6661-5863

Mysidopsis 7-d Survival, Growth and Fecundity Test

Rainier Environmental Laboratory

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	1	0.8	1	1	0.8	1	1	0.8
0.77		1	1	1	1	1	1	1	0.8
2.5		1	1	0.8	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1
50		1	1	1	1	0.8	1	1	1
100		1	1	0.6	0.6	1	0.8	1	1

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.302	0.234	0.392	0.382	0.264	0.298	0.424	0.286
0.77		0.31	0.294	0.29	0.386	0.306	0.296	0.344	0.24
2.5		0.352	0.314	0.196	0.402	0.29	0.336	0.358	0.356
12.5		0.344	0.38	0.386	0.382	0.394	0.272	0.382	0.342
50		0.312	0.276	0.358	0.352	0.322	0.268	0.336	0.336
100		0.282	0.224	0.198	0.178	0.238	0.24	0.3	0.246

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	0.302	0.2925	0.392	0.382	0.33	0.298	0.424	0.3575
0.77		0.31	0.294	0.29	0.386	0.306	0.296	0.344	0.3
2.5		0.352	0.314	0.245	0.402	0.29	0.336	0.358	0.356
12.5		0.344	0.38	0.386	0.382	0.394	0.272	0.382	0.342
50		0.312	0.276	0.358	0.352	0.4025	0.268	0.336	0.336
100		0.282	0.224	0.33	0.2967	0.238	0.3	0.3	0.246

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Dilution Water	5/5	4/5	5/5	5/5	4/5	5/5	5/5	4/5
0.77		5/5	5/5	5/5	5/5	5/5	5/5	5/5	4/5
2.5		5/5	5/5	4/5	5/5	5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	4/5	5/5	5/5	5/5
100		5/5	5/5	3/5	3/5	5/5	4/5	5/5	5/5

Initial and Final Chemistries

Seven Day Chronic Saltwater Bioassay

Client: Birch Bay
 Sample ID: Final Effluent
 Test No: 2401-052
 Rainier Check-In #: 24-019 24-023

Start Date & Time: 1/30/2024 1340
 Stop Date & Time: 2/6/2024 1310
 Test species: Americamysis bahia
24-025

Conc. or CON	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.36	8.23	8.32	8.11	8.28	8.18	8.23	8.20	8.18	8.05	8.20	8.02	8.17	8.01
DO (mg/l)	6.4	6.0	6.5	5.7	6.2	5.8	6.7	5.5	6.5	5.2	6.7	5.2	6.2	5.4
Salinity (ppt)	28.6	28.2	28.4	29.0	28.5	29.0	28.6	29.1	28.6	29.0	28.6	29.0	28.6	29.1
Temperature (°C)	25.2	25.3	25.1	25.2	25.1	25.3	25.0	25.2	25.0	25.1	25.0	25.1	25.1	25.2
0.77	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
	8.37	8.19	8.35	8.14	8.30	8.20	8.30	8.11	8.20	8.10	8.22	8.01	8.21	8.00
	6.4	5.8	6.6	5.4	6.4	5.8	6.5	5.2	6.5	5.1	6.6	5.0	6.5	5.1
	28.1	28.9	28.6	28.9	28.5	28.7	28.6	28.8	28.6	28.2	28.6	28.8	28.6	29.0
2.5	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
	8.37	8.18	8.36	8.12	8.29	8.17	8.27	8.15	8.21	8.11	8.21	8.04	8.22	8.03
	6.5	5.8	6.7	5.2	6.5	5.8	6.5	5.4	6.6	5.3	6.5	5.1	6.6	5.7
	28.1	29.0	28.9	29.4	28.5	28.5	28.6	28.9	28.6	28.7	28.6	28.9	28.7	29.2
12.5	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
	8.36	8.19	8.35	8.10	8.27	8.15	8.24	8.14	8.22	8.13	8.18	8.11	8.17	8.07
	6.5	5.7	6.8	5.4	6.5	5.5	6.6	5.6	6.5	5.4	6.6	5.2	6.7	5.8
	28.9	29.0	29.0	29.2	28.6	29.1	28.7	29.4	28.6	28.9	28.8	29.0	29.0	29.3
50	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
	8.36	8.13	8.27	8.11	8.22	8.12	8.19	8.13	8.20	8.15	8.15	8.07	8.14	8.10
	6.6	5.6	6.8	5.5	6.6	5.2	6.5	5.4	6.4	5.8	6.5	5.1	6.6	5.8
	29.0	29.5	28.9	29.4	29.0	29.4	29.0	29.5	28.5	29.0	29.2	29.3	29.3	29.5
100	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
	8.22	8.12	8.19	8.13	8.18	8.09	8.15	8.11	8.16	8.10	8.13	8.11	8.12	8.11
	6.8	5.7	6.8	5.2	6.5	5.4	6.5	5.3	6.5	5.4	6.7	5.2	6.6	5.5
	29.0	29.4	28.9	29.5	29.4	29.7	29.5	29.7	28.2	28.4	29.9	30.4	30.1	29.9
Temperature (°C)		25.0	25.4	25.4	25.2	25.7	25.3	25.8	25.3	25.5	25.1	25.4	25.2	25.3
Tech Initials:		AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF	AF

Rainier Environmental
 Washington Laboratory
 5013 Pacific Hwy. E., Suite 20
 Tacoma, WA 98424

Test Chamber: VWR
 Dilution Water Batch #: ASW 002

QA Check: AF

Sample Description:

Organism Source: ABS
 Date Received: 1/30/24
 Date of Hatch: 1/23/24

Comments: _____

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy. E., Suite 20
Tacoma, WA 98424

Raw Data Sheet
Mysid Shrimp
(*Americamysis bahia*)
Mysid Survival

Client: Birch Bay

Test Number: 2401-052

Sample ID: FINAL EFFLUENT

Conc. or (%)	Cont.	Rep.	Days								Mean % Survival
			0	1	2	3	4	5	6	7	
CON	21	1	5	5	5	5	5	5	5	5	
	42	2	5	5	4	4	4	4	4	4	
	4	3	5	5	5	5	5	5	5	5	
	20	4	5	5	5	5	5	5	5	5	
	30	5	5	4	4	4	4	4	4	4	
	1	6	5	5	5	5	5	5	5	5	
	24	7	5	5	5	5	5	5	5	5	
	36	8	5	4	4	4	4	4	4	4	
0.17	14	1	5	5	5	5	5	5	5	5	
	25	2	5	5	5	5	5	5	5	5	
	35	3	5	5	5	5	5	5	5	5	
	3	4	5	5	5	5	5	5	5	5	
	8	5	5	5	5	5	5	5	5	5	
	29	6	5	5	5	5	5	5	5	5	
	18	7	5	5	5	5	5	5	5	5	
	11	8	5	4	4	4	4	4	4	4	
2.5	31	1	5	5	5	5	5	5	5	5	
	1	2	5	5	5	5	5	5	5	5	
	39	3	5	4	4	4	4	4	4	4	
	17	4	5	5	5	5	5	5	5	5	
	12	5	5	5	5	5	5	5	5	5	
	45	6	5	5	5	5	5	5	5	5	
	23	7	5	5	5	5	5	5	5	5	
	48	8	5	5	5	5	5	5	5	5	
Technician Initials			JD	AK	ET	ET	ET	ET	ET	AK	

Feeding Times: 0 1000 1 0800 2 0730 3 0715 4 0715 5 0730 6 0715
1615 1600 1545 1545 1430 1500 1545

QA check 4

Comments: _____

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy. E., Suite 20
Tacoma, WA 98424

Raw Data Sheet
Mysid Shrimp
(*Americamysis bahia*)
Mysid Survival

Client: Birch Bay

Test Number: 2401-052

Sample ID: FINAL EFFLUENT

Conc. or (%)	Cont.	Rep.	Days								Mean % Survival
			0	1	2	3	4	5	6	7	
12.5	22	1	5	5	5	5	5	5	5	5	
	47	2	5	5	5	5	5	5	5	5	
	10	3	5	5	5	5	5	5	5	5	
	44	4	5	5	5	5	5	5	5	5	
	27	5	5	5	5	5	5	5	5	5	
	2	6	5	5	5	5	5	5	5	5	
	37	7	5	5	5	5	5	5	5	5	
	5	8	5	5	5	5	5	5	5	5	
50	26	1	5	5	5	5	5	5	5	5	
	15	2	5	5	5	5	5	5	5	5	
	38	3	5	5	5	5	5	5	5	5	
	34	4	5	5	5	5	5	5	5	5	
	6	5	5	5	4	4	4	4	4	4	
	43	6	5	5	5	5	5	5	5	5	
	19	7	5	5	5	5	5	5	5	5	
	46	8	5	5	5	5	5	5	5	5	
100	16	1	5	5	5	5	5	5	5	5	
	28	2	5	5	5	5	5	5	5	5	
	9	3	5	4	3	3	3	3	3	3	
	33	4	5	4	3	3	3	3	3	3	
	40	5	5	5	4.5	4.5	5	5	5	5	
	13	6	5	5	4	4	4	4	4	4	
	32	7	5	5	5	5	5	5	5	5	
	41	8	5	5	5	5	5	5	5	5	
Technician Initials			W	W	W	W	W	W	W	W	

Feeding Times: 0 10:00 1 16:15 2 07:30 3 07:15 4 07:15 5 09:30 6 07:15
16:15 16:00 15:45 15:45 14:30 15:00 15:45

QA check W

Comments: _____

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy. E., Suite 20
Tacoma, WA 98424

Raw Data Sheet
Mysid Weights
Seven Day Chronic Bioassay

Client: Birch Bay

Species: Americamysis bahia

Sample ID: FWAL EFFLUENT

Test Number: 2701-052

Conc. or %	Cont.	Rep.	pan wt. (gm)	pan + mysid (gm)	mysid wt. (mg)	# mysids	avg. per mysid (mg)	avg. per conc.
CON	21	1	0.04333	0.04484		5		
	42	2	0.04250	0.04367		4		
	4	3	0.04213	0.04469		5		
	20	4	0.04522	0.04713		5		
	30	5	0.04218	0.04350		4		
	1	6	0.04079	0.04228		5		
	24	7	0.04285	0.04497		5		
	36	8	0.04415	0.04558		4		
0.77	14	1	0.04470	0.04625		5		
	25	2	0.04450	0.04597		5		
	35	3	0.04412	0.04557		5		
	3	4	0.04115	0.04308		5		
	8	5	0.04495	0.04648		5		
	29	6	0.04174	0.04322		5		
	18	7	0.04455	0.04627		5		
	11	8	0.04618	0.04738		4		
2.5	31	1	0.04361	0.04537		5		
	7	2	0.04443	0.04600		5		
	39	3	0.04344	0.04442		4		
	17	4	0.04419	0.04620		5		
	12	5	0.04548	0.04693		5		
	45	6	0.04247	0.04415		5		
	23	7	0.04305	0.04484		5		
	48	8	0.04597	0.04775		5		

Tech Initials: af vt

Date/Time in: 2/6/2024 1310
Date/Time out: 2/8/2024 1230

Oven temp. (°C): 64.0
Oven temp. (°C): 62.5

QA Check: vt

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy. E., Suite 20
Tacoma, WA 98424

Raw Data Sheet
Mysid Weights
Seven Day Chronic Bioassay

Client: Birch Bay

Species: Americamysis bahia

Sample ID: FINAL EFFLUENT

Test Number: 2401-052

Conc. or ②	Cont.	Rep.	pan wt. (gm)	pan + mysid (gm)	mysid wt. (mg)	# mysids	avg. per mysid (mg)	avg. per conc.
12.5	22	1	0.04279	0.04451		5		
	47	2	0.04513	0.04703		5		
	10	3	0.04699	0.04892		5		
	44	4	0.04389	0.04590		5		
	27	5	0.04474	0.04671		5		
	2	6	0.04256	0.04392		5		
	37	7	0.04337	0.04528		5		
	5	8	0.04469	0.04640		5		
50	26	1	0.04489	0.04645		5		
	15	2	0.04356	0.04494		5		
	38	3	0.04333	0.04512		5		
	34	4	0.04365	0.04541		5		
	6	5	0.04537	0.04698		4		
	43	6	0.04279	0.04413		5		
	19	7	0.04397	0.04565		5		
	46	8	0.04499	0.04667		5		
100	16	1	0.04523	0.04664		5		
	28	2	0.04415	0.04527		5		
	9	3	0.04592	0.04691		3		
	33	4	0.04332	0.04421		3		
	40	5	0.04336	0.04455		5		
	13	6	0.04460	0.04580		4		
	32	7	0.04268	0.04418		5		
	41	8	0.04268	0.04391		5		

Tech Initials: JS BT

Date/Time in: 2/6/2024 1310
Date/Time out: 2/8/2024 1230

Oven temp. (°C): 64.0
Oven temp. (°C): 62.5

QA Check: BT

Appendix B
***Atherinops affinis* (Pacific topsmelt) Chronic Test**
Statistical Summaries and Raw Bench Sheets

CETIS Summary Report

Report Date: 14 Feb-24 15:45 (p 1 of 2)
 Test Code: 2401-053 | 12-9691-7398

Pacific Topsmelt 7-d Survival and Growth Test

Rainier Environmental Laboratory

Batch ID:	00-3359-8953	Test Type:	Growth-Survival (7d)	Analyst:	Eric Tollefson
Start Date:	30 Jan-24 11:30	Protocol:	EPA/600/R-95/136 (1995)	Diluent:	Laboratory Seawater
Ending Date:	06 Feb-24 11:00	Species:	Atherinops affinis	Brine:	Crystal Sea
Duration:	7d	Source:	Aquatic Biosystems, CO	Age:	11d
Sample ID:	04-9614-8712	Code:	24-019	Client:	Birch Bay
Sample Date:	29 Jan-24 09:00	Material:	POTW Effluent	Project:	
Receive Date:	30 Jan-24 09:40	Source:	Birch Bay (WA0029556)		
Sample Age:	26h (4 °C)	Station:			

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
07-7556-8955	7d Survival Rate	100	>100	NA	9.1%	1	Steel Many-One Rank Sum Test
17-4675-5701	Mean Dry Biomass-mg	100	>100	NA	19.4%	1	Dunnett Multiple Comparison Test
02-8548-4956	Mean Dry Weight-mg	100	>100	NA	18.3%	1	Dunnett Multiple Comparison Test

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits	Overlap	Decision
07-7556-8955	7d Survival Rate	Control Resp	0.96	0.8 - NL	Yes	Passes Acceptability Criteria
17-4675-5701	Mean Dry Biomass-mg	Control Resp	0.944	0.85 - NL	Yes	Passes Acceptability Criteria
07-7556-8955	7d Survival Rate	PMSD	0.09104	NL - 0.25	No	Passes Acceptability Criteria
17-4675-5701	Mean Dry Biomass-mg	PMSD	0.194	NL - 0.5	No	Passes Acceptability Criteria

7d Survival Rate Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	0.96	0.9266	0.9934	0.8	1	0.04	0.08944	9.32%	0.0%
0.77		5	1	1	1	1	1	0	0	0.0%	-4.17%
2.5		5	1	1	1	1	1	0	0	0.0%	-4.17%
12.5		5	0.96	0.9266	0.9934	0.8	1	0.04	0.08944	9.32%	0.0%
50		5	1	1	1	1	1	0	0	0.0%	-4.17%
100		5	1	1	1	1	1	0	0	0.0%	-4.17%

Mean Dry Biomass-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	0.944	0.8788	1.009	0.786	1.204	0.07809	0.1746	18.5%	0.0%
0.77		5	1.042	1.016	1.069	0.968	1.134	0.03189	0.07131	6.84%	-10.42%
2.5		5	0.9684	0.9136	1.023	0.882	1.228	0.06566	0.1468	15.16%	-2.59%
12.5		5	0.8572	0.8308	0.8836	0.792	0.97	0.03168	0.07083	8.26%	9.2%
50		5	0.9028	0.8731	0.9325	0.79	0.984	0.03558	0.07957	8.81%	4.36%
100		5	1.022	0.9673	1.077	0.768	1.126	0.06594	0.1475	14.42%	-8.31%

Mean Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Dilution Water	5	0.985	0.9246	1.045	0.786	1.204	0.07237	0.1618	16.43%	0.0%
0.77		5	1.042	1.016	1.069	0.968	1.134	0.03189	0.07131	6.84%	-5.83%
2.5		5	0.9684	0.9136	1.023	0.882	1.228	0.06566	0.1468	15.16%	1.69%
12.5		5	0.8968	0.8669	0.9267	0.802	0.99	0.03579	0.08002	8.92%	8.95%
50		5	0.9028	0.8731	0.9325	0.79	0.984	0.03558	0.07957	8.81%	8.35%
100		5	1.022	0.9673	1.077	0.768	1.126	0.06594	0.1475	14.42%	-3.8%

CETIS Summary Report

Report Date: 14 Feb-24 15:45 (p 2 of 2)
 Test Code: 2401-053 | 12-9691-7398

Pacific Topsmelt 7-d Survival and Growth Test

Rainier Environmental Laboratory

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1	1	0.8	1	1
0.77		1	1	1	1	1
2.5		1	1	1	1	1
12.5		1	0.8	1	1	1
50		1	1	1	1	1
100		1	1	1	1	1

Mean Dry Biomass-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.204	1.038	0.82	0.872	0.786
0.77		1.09	0.978	1.134	0.968	1.042
2.5		0.882	0.938	0.908	0.886	1.228
12.5		0.864	0.792	0.802	0.97	0.858
50		0.79	0.94	0.852	0.984	0.948
100		0.768	1.032	1.066	1.126	1.12

Mean Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	1.204	1.038	1.025	0.872	0.786
0.77		1.09	0.978	1.134	0.968	1.042
2.5		0.882	0.938	0.908	0.886	1.228
12.5		0.864	0.99	0.802	0.97	0.858
50		0.79	0.94	0.852	0.984	0.948
100		0.768	1.032	1.066	1.126	1.12

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Dilution Water	5/5	5/5	4/5	5/5	5/5
0.77		5/5	5/5	5/5	5/5	5/5
2.5		5/5	5/5	5/5	5/5	5/5
12.5		5/5	4/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5

Initial and Final Chemistries

Seven Day Chronic Saltwater Bioassay

Client: Birch Bay
 Sample ID: Final Effluent
 Test No: 2401-053
 Rainier Check-In #: 24-019 24-023

Start Date & Time: 1/30/24 1130
 Stop Date & Time: 2/6/24 1100
 Test species: Atherinops affinis
24-025

Conc. or % CON	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
pH	8.43	8.21	8.40	8.19	8.37	8.15	8.38	8.11	8.15	7.92	7.94	7.14	7.87	7.75
DO (mg/l)	6.7	7.1	6.8	6.6	6.8	6.8	7.0	6.7	7.0	6.5	7.2	6.4	7.0	6.6
Salinity (ppt)	28.5	28.4	28.6	28.3	28.4	28.5	28.5	28.4	28.7	28.0	28.7	28.9	29.1	29.0
Temperature (°C)	19.9	20.2	20.1	20.2	20.2	19.9	20.3	20.1	20.4	20.0	19.8	20.1	20.1	19.9
0.77	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
	8.40	8.20	8.41	8.22	8.35	8.12	8.31	8.09	8.15	7.91	7.99	7.18	7.85	7.78
	6.7	7.1	6.7	6.6	6.7	6.7	7.1	6.5	7.0	6.7	7.3	6.4	7.1	6.8
2.5	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
	8.34	8.19	8.38	8.20	8.32	8.07	8.33	8.05	8.17	7.95	7.98	7.19	7.84	7.75
	6.8	7.2	6.4	6.4	6.7	6.8	7.1	6.5	6.9	6.6	7.3	6.7	7.1	6.8
12.5	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
	8.38	8.26	8.37	8.18	8.34	8.10	8.30	8.05	8.24	7.97	8.10	7.19	7.82	7.74
	6.8	7.0	6.9	6.4	6.7	6.8	7.2	6.3	6.8	6.8	7.3	6.7	7.2	6.7
50	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
	8.32	8.16	8.30	8.14	8.30	8.05	8.27	8.01	8.31	7.91	8.12	7.18	7.80	7.74
	6.9	7.0	7.0	6.5	6.8	6.6	7.2	6.7	6.9	6.7	7.0	6.8	7.2	6.5
100	Days													
	0		1		2		3		4		5		6	
	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final	init.	final
	8.20	8.09	8.19	8.11	8.15	8.03	8.21	7.98	8.33	7.85	8.13	7.80	7.98	7.81
	7.0	6.9	7.1	6.8	7.0	6.9	7.3	6.9	7.0	6.9	7.1	6.8	7.2	6.9
Tech Initials: <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u> <u>ST</u>														

Rainier Environmental
 Washington Laboratory
 5013 Pacific Hwy. E., Suite 20
 Tacoma, WA 98424

QA Check: ST

Sample Description:

Organism Source: ABSDate Received: 1/30/24Date of Hatch: 1/19/24

Comments:

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy. E., Suite 20
Tacoma, WA 98424

Raw Data Sheet
Pacific Topsmelt
(*Atherinops affinis*)
Larval Survival

Client Name: Birch Bay

Test No.: 2401-053

Sample ID: FINAL EFFLUENT

Conc. or %	Cont.	Rep.	Days								Mean % Survival
			0	1	2	3	4	5	6	7	
CON	8	1	5	5	5	5	5	5	5	5	
	9	2	5	5	5	5	5	5	5	5	
	28	3	5	5	5	5	5	5	4	4	
	2	4	5	5	5	5	5	5	5	5	
	19	5	5	5	5	5	5	5	5	5	
0.71	15	1	5	5	5	5	5	5	5	5	
	18	2	5	5	5	5	5	5	5	5	
	1	3	5	5	5	5	5	5	5	5	
	13	4	5	5	5	5	5	5	5	5	
	21	5	5	5	5	5	5	5	5	5	
2.5	3	1	5	5	5	5	5	5	5	5	
	17	2	5	5	5	5	5	5	5	5	
	4	3	5	5	5	5	5	5	5	5	
	23	4	5	5	5	5	5	5	5	5	
	10	5	5	5	5	5	5	5	5	5	
12.5	26	1	5	5	5	5	5	5	5	5	
	4	2	5	5	5	5	5	5	5	5	
	16	3	5	4	4	4	4	4	4	4	
	11	4	5	5	5	5	5	5	5	5	
	22	5	5	5	5	5	5	5	5	5	
50	29	1	5	5	5	5	5	5	5	5	
	5	2	5	5	5	5	5	5	5	5	
	21	3	5	5	5	5	5	5	5	5	
	12	4	5	5	5	5	5	5	5	5	
	24	5	5	5	5	5	5	5	5	5	
100	30	1	5	5	5	5	5	5	5	5	
	14	2	5	5	5	5	5	5	5	5	
	7	3	5	5	5	5	5	5	5	5	
	20	4	5	5	5	5	5	5	5	5	
	25	5	5	5	5	5	5	5	5	5	
Tech Initials			et	et	et	et	et	et	et	et	

Feeding Times: 0 1000 1 1615 2 1600 3 1545 4 1545 5 1430 6 1500 7 1545

Comments: _____ QA Check et

Rainier Environmental
Washington Laboratory
5013 Pacific Hwy., E. Suite 20
Tacoma, WA 98424

Fish Weights
Seven Day Chronic Bioassay

Client: Birch Bay

Species: A. affinis

Sample ID: FINAL EFFLUENT

Test No: 2401-053

Conc. or ②	cont. #	rep.	pan wt. (gm)	pan + fish (gm)	fish wt. (mg)	# fish	avg. per fish (mg)	avg. per conc. (mg)
CON	8	1	0.04318	0.04920		5		
	9	2	0.04304	0.04823		5		
	28	3	0.04346	0.04756		4		
	2	4	0.04436	0.04872		5		
	19	5	0.04298	0.04691		5		
0.77	15	1	0.04342	0.04987		5		
	18	2	0.04258	0.04747		5		
	1	3	0.04358	0.04925		5		
	13	4	0.04406	0.04890		5		
	27	5	0.04341	0.04862		5		
2.5	3	1	0.04408	0.04849		5		
	17	2	0.04389	0.04858		5		
	6	3	0.04236	0.04690		5		
	23	4	0.04293	0.04736		5		
	10	5	0.04351	0.04965		5		
12.5	26	1	0.04421	0.04853		5		
	4	2	0.04334	0.04730		5		
	16	3	0.04392	0.04793		4		
	11	4	0.04240	0.04725		5		
	22	5	0.04434	0.04863		5		
50	29	1	0.04354	0.04749		5		
	5	2	0.04182	0.04652		5		
	21	3	0.04453	0.04879		5		
	12	4	0.04292	0.04784		5		
	24	5	0.04477	0.04951		5		
100	30	1	0.04329	0.04713		5		
	14	2	0.04476	0.04992		5		
	7	3	0.04258	0.04791		5		
	20	4	0.04322	0.04885		5		
	25	5	0.04507	0.05067		5		
Tech Initials:			df	et				

Date/Time in: 2/6/2024 1100
Date/Time out: 2/8/2024 1230

Oven temp. (°C): 62.0
Oven temp. (°C): 62.5

QA check et

Appendix C

Control QC Plots

Mysidopsis 7-d Survival, Growth and Fecundity Test

Rainier Environmental Laboratory

Test Type: Growth-Survival (7d)

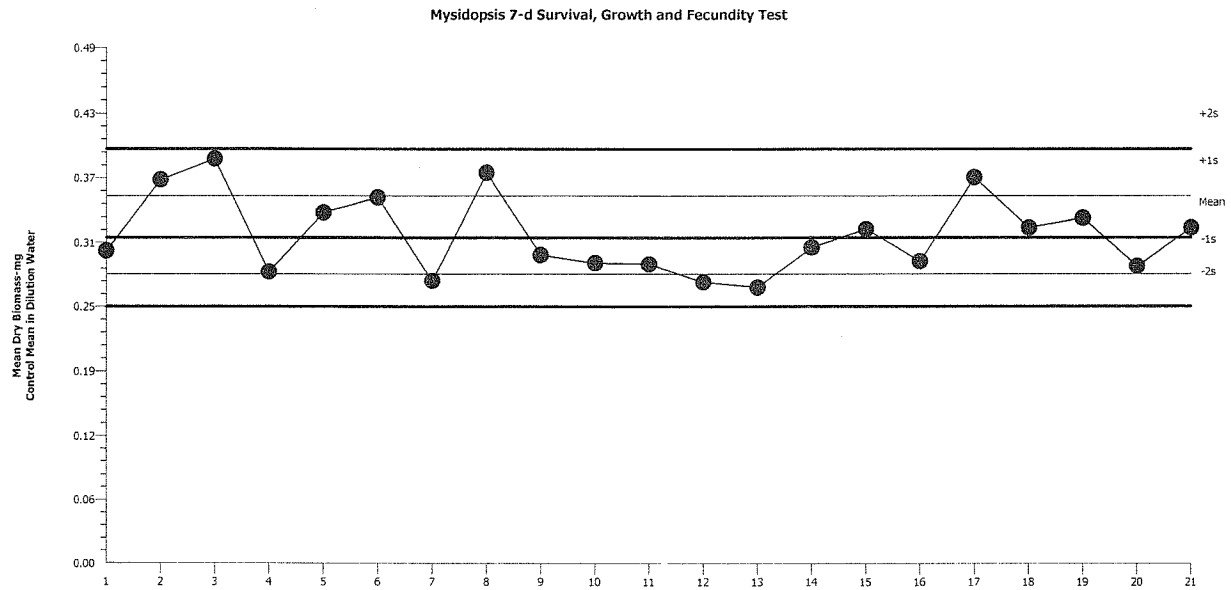
Organism: Mysidopsis bahia (Atlantic Mysid)

Material: All Materials

Protocol: EPA/821/R-02-014 (2002)

Endpoint: Mean Dry Biomass-mg

Source: All SampleID Sources



Mean: 0.3135

Count: 20

-1s Warning Limit: 0.2781

-2s Action Limit: 0.2468

Sigma: NA

CV: 12.70%

+1s Warning Limit: 0.3533

+2s Action Limit: 0.3982

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2022	Jun	28	0.3007	-0.01279	-0.3482			12-4798-0669	
2		Jul	26	0.3685	0.05501	1.352	(+)		12-8203-7037	
3			26	0.3885	0.07501	1.794	(+)		16-3991-3178	
4		Aug	30	0.2805	-0.03299	-0.9296			03-3763-1524	
5			30	0.3373	0.02381	0.6122			04-8469-4882	
6		Oct	18	0.3517	0.03821	0.9617			07-6505-9381	
7			18	0.2717	-0.04179	-1.196	(-)		14-1722-5275	
8			18	0.3752	0.06171	1.503	(+)		17-0962-9515	
9		Nov	15	0.2968	-0.01669	-0.4573			10-4540-6015	
10			15	0.289	-0.02449	-0.68			16-8953-5320	
11	2023	Feb	14	0.288	-0.02549	-0.709			16-3174-0222	
12			14	0.2703	-0.04319	-1.239	(-)		19-5181-2318	
13		Jun	20	0.2655	-0.04799	-1.389	(-)		11-6707-3060	
14		Sep	19	0.3038	-0.009686	-0.2624			14-1206-6025	
15			19	0.3215	0.008014	0.2111			08-4328-9224	
16			19	0.2907	-0.02279	-0.631			09-3046-9852	
17		Dec	7	0.3707	0.05721	1.402	(+)		19-4896-5773	
18			7	0.3227	0.009214	0.2422			02-6887-3147	
19	2024	Jan	23	0.332	0.01851	0.4798			07-5636-7580	
20			23	0.286	-0.02749	-0.7673			07-7768-5247	
21			30	0.3227	0.009214	0.2422			06-6661-5863	

Mysidopsis 7-d Survival, Growth and Fecundity Test

Rainier Environmental Laboratory

Test Type: Growth-Survival (7d)

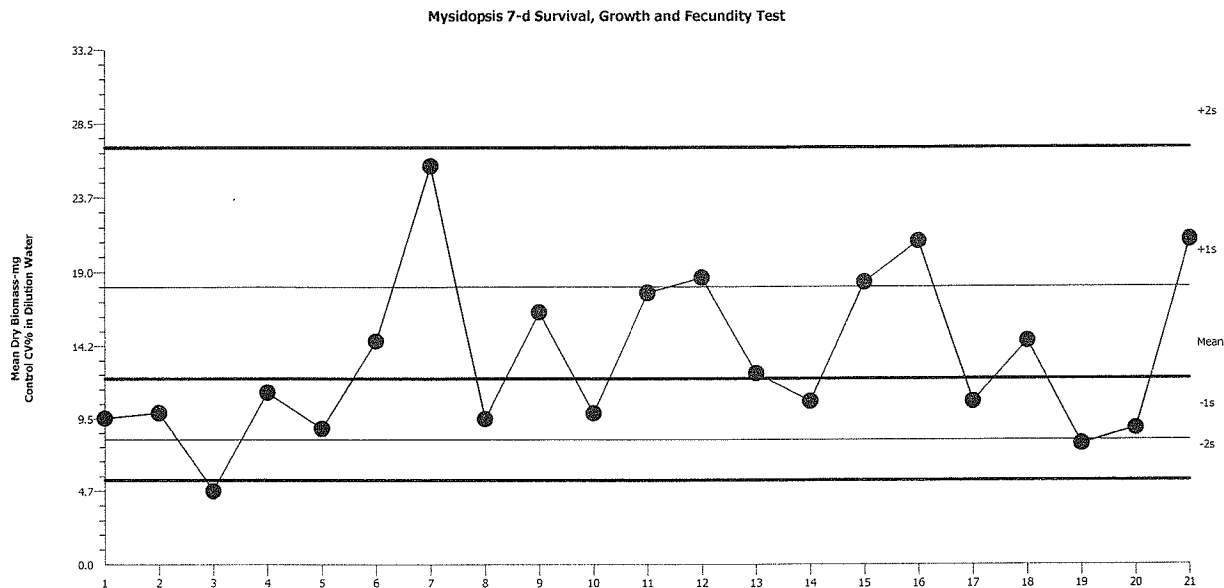
Organism: Mysidopsis bahia (Atlantic Mysid)

Material: All Materials

Protocol: EPA/821/R-02-014 (2002)

Endpoint: Mean Dry Biomass-mg

Source: All SampleID Sources



Mean: 12.11

Count: 20

-1s Warning Limit: 8.121

-2s Action Limit: 5.446

Sigma: NA

CV: 49.10%

+1s Warning Limit: 18.06

+2s Action Limit: 26.93

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2022	Jun	28	9.524	-2.586	-0.6011			12-4798-0669	
2		Jul	26	9.871	-2.239	-0.5115			12-8203-7037	
3			26	4.748	-7.362	-2.343	(-)	(-)	16-3991-3178	
4		Aug	30	11.21	-0.8996	-0.1932			03-3763-1524	
5			30	8.847	-3.263	-0.7856			04-8469-4882	
6		Oct	18	14.56	2.45	0.4612			07-6505-9381	
7			18	25.74	13.63	1.887	(+)		14-1722-5275	
8			18	9.478	-2.632	-0.6132			17-0962-9515	
9		Nov	15	16.43	4.32	0.7635			10-4540-6015	
10			15	9.85	-2.26	-0.5168			16-8953-5320	
11	2023	Feb	14	17.67	5.56	0.9456			16-3174-0222	
12			14	18.64	6.53	1.079	(+)		19-5181-2318	
13		Jun	20	12.45	0.3404	0.06937			11-6707-3060	
14		Sep	19	10.63	-1.48	-0.3261			14-1206-6025	
15			19	18.35	6.24	1.04	(+)		08-4328-9224	
16			19	20.95	8.84	1.372	(+)		09-3046-9852	
17		Dec	7	10.63	-1.48	-0.3261			19-4896-5773	
18			7	14.59	2.48	0.4663			02-6887-3147	
19	2024	Jan	23	7.854	-4.256	-1.084	(-)		07-5636-7580	
20			23	8.877	-3.233	-0.7771			07-7768-5247	
21			30	21.04	8.93	1.382	(+)		06-6661-5863	

Pacific Topsmelt 7-d Survival and Growth Test

Rainier Environmental Laboratory

Test Type: Growth-Survival (7d)

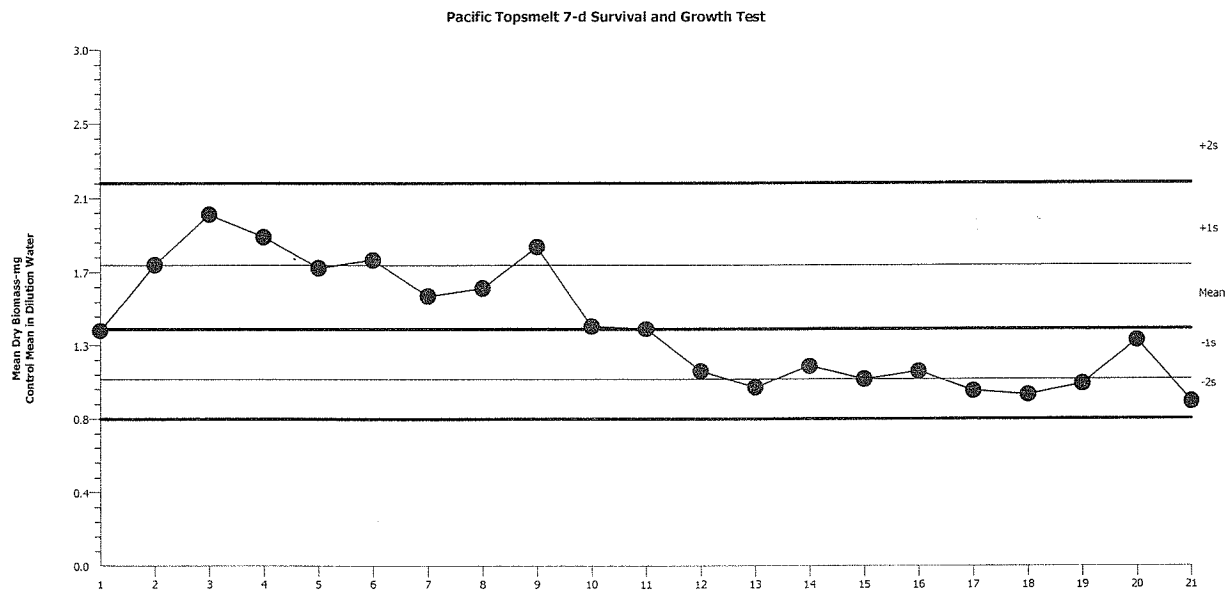
Organism: Atherinops affinis (Topsmelt)

Material: All Materials

Protocol: EPA/600/R-95/136 (1995)

Endpoint: Mean Dry Biomass-mg

Source: All SampleID Sources



Mean: 1.366

Count: 20

-1s Warning Limit: 1.075

-2s Action Limit: 0.8464

Sigma: NA

CV: 27.00%

+1s Warning Limit: 1.735

+2s Action Limit: 2.203

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2022	Jun	21	1.356	-0.009608	-0.02952			07-1455-1987	
2			28	1.736	-0.3704	1.003	(+)		14-1249-2753	
3		Jul	26	2.022	0.6564	1.641	(+)		06-9127-6800	
4			26	1.895	0.5294	1.37	(+)		02-8736-4026	
5		Aug	30	1.718	0.3524	0.9597			04-8631-7953	
6			30	1.763	0.3974	1.068	(+)		01-7642-5485	
7		Oct	18	1.558	0.1924	0.551			18-9262-1368	
8			18	1.603	0.2374	0.6701			06-3956-3589	
9			18	1.838	0.4724	1.242	(+)		16-0050-5061	
10		Nov	15	1.381	0.01539	0.04686			02-6388-3938	
11			15	1.366	0.0003917	0.001199			19-7735-5874	
12	2023	Feb	14	1.12	-0.2456	-0.8289			13-3851-4935	
13			14	1.028	-0.3376	-1.187	(-)		05-2095-0938	
14		Sep	19	1.149	-0.2166	-0.722			01-4985-4309	
15			19	1.074	-0.2916	-1.004	(-)		04-2870-8687	
16			19	1.12	-0.2456	-0.8289			18-5036-9464	
17		Dec	7	1.007	-0.3586	-1.274	(-)		17-3680-6402	
18			7	0.9848	-0.3808	-1.367	(-)		12-7265-0591	
19	2024	Jan	23	1.048	-0.3176	-1.107	(-)		17-5564-6480	
20			23	1.3	-0.06561	-0.2058			16-5544-6742	
21			30	0.944	-0.4216	-1.544	(-)		12-9691-7398	

Pacific Topsmelt 7-d Survival and Growth Test

Rainier Environmental Laboratory

Test Type: Growth-Survival (7d)

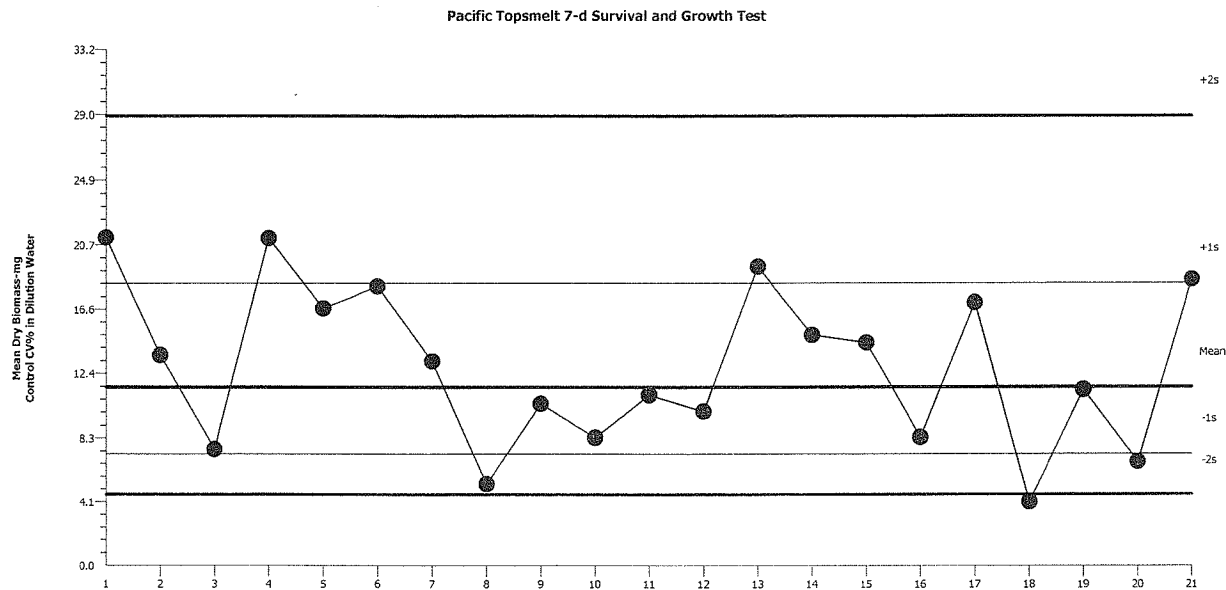
Organism: Atherinops affinis (Topsmelt)

Material: All Materials

Protocol: EPA/600/R-95/136 (1995)

Endpoint: Mean Dry Biomass-mg

Source: All SampleID Sources



Mean: 11.54

Count: 20

-1s Warning Limit: 7.292

-2s Action Limit: 4.607

Sigma: NA

CV: 58.30%

+1s Warning Limit: 18.27

+2s Action Limit: 28.92

Quality Control Data

Point	Year	Month	Day	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2022	Jun	21	21.2	9.658	1.324	(+)		07-1455-1987	
2			28	13.61	2.068	0.3589			14-1249-2753	
3		Jul	26	7.574	-3.968	-0.9174			06-9127-6800	
4			26	21.16	9.618	1.32	(+)		02-8736-4026	
5		Aug	30	16.64	5.098	0.7966			04-8631-7953	
6			30	18.06	6.518	0.975			01-7642-5485	
7		Oct	18	13.21	1.668	0.2939			18-9262-1368	
8			18	5.312	-6.23	-1.69	(-)		06-3956-3589	
9			18	10.49	-1.052	-0.2081			16-0050-5061	
10		Nov	15	8.322	-3.22	-0.7123			02-6388-3938	
11			15	11.05	-0.4921	-0.09488			19-7735-5874	
12	2023	Feb	14	10	-1.542	-0.3123			13-3851-4935	
13			14	19.33	7.788	1.123	(+)		05-2095-0938	
14		Sep	19	14.9	3.358	0.5561			01-4985-4309	
15			19	14.41	2.868	0.4833			04-2870-8687	
16			19	8.344	-3.198	-0.7066			18-5036-9464	
17		Dec	7	17	5.458	0.8432			17-3680-6402	
18			7	4.144	-7.398	-2.231	(-)	(-)	12-7265-0591	
19	2024	Jan	23	11.39	-0.1521	-0.02889			17-5564-6480	
20			23	6.763	-4.779	-1.164	(-)		16-5544-6742	
21			30	18.5	6.958	1.027	(+)		12-9691-7398	

Appendix D
Sample Check-In Sheet

Client: Birch Bay Water & Sewer

Tests Performed: Cd-u, PP-u, MR-C, AA-C
Test ID No(s): 2401-052, 2401-053, 2401-054, 2401-055

Sample ID:	Final Effluent	Final Effluent	Final Effluent
Log-in No. (20-xxxx):	24-019	24-023	24-025
Sample Collection Date & Time:	1/29/24 0900	2/1/24 13/240900	2/2/24 0900
Sample Receipt Date & Time:	1/30/24 0940	2/1/24 1230	2/3/24 0925
Check-in Temperature (°C)	4.0	1.5	4.0
Temperature OK?	<input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> N
DO (mg/L)	9.4	7.5	9.0
pH (units)	7.08	7.23	7.12
Conductivity (µS/cm)	1408	1409	1402
Salinity (ppt)	0.7	0.8	0.7
Tit. Vol / Sam. Vol. / Alkalinity (mg/L)*	2.8 / 25 / 112	2.6 / 125 / 104	2.5 / 125 / 100
Tit. Vol. / Sam. Vol. / Hardness (mg/L)* ^a	4.1 / 25 / 164	4.0 / 125 / 160	4.3 / 125 / 172
Total Chlorine (mg/L)	<0.03	<0.03	<0.03
Total Ammonia Nitrogen (mg/L)	5.3	44	5.0
Technician Initials	df	df	df

* = mg/L as CaCO₃, ^a = Measured for freshwater samples only, NA = Not Applicable,
N/M = Not Measured

Freshwater Tests:

Control/Dilution Water Source: test type: PP-u 8.2 (DMW) W/HW Other: 010 Alkalinity: 68 Hardness: 100

Control/Dilution Water Source: test type: 8.2 (DMW) MHW Other: NA Alkalinity: NA Hardness: NA

Additional Control? Y N = NA Alkalinity: NA Hardness: NA

Marine Tests:

Control/Dilution Water Source: test type: AA-C ART SW 002 NAT SW Alkalinity: 112 Salinity: 27.3

Control/Dilution Water Source: test type: ART SW NAT SW Alkalinity: NA Salinity: NA

Additional Control? Y N = NA Alkalinity: NA Salinity: NA

Sample Salted w/ artificial salt? Y N If yes, what ppt? NA test type: NA

Sample salted w/brine? Y N If yes, what ppt? NA test type: NA

Comments: Temperature for grab sample must be 0-20°C if received within 1 hour of collection time, 0-12°C if effluent received within 4 hours of collection time, and 0-6°C for all other samples.

QC Check: df

Sample Description:

COC Complete? Y or N
1 Y 2 Y 3 Y

Filtration? Y N
Pore Size: NA

Organisms or Debris

Aeration? Y N
Length of Time: NA

Final DO: NA
Final pH: NA

Hardness Adjustment? Y N
If adjusted, please see worksheet for details.

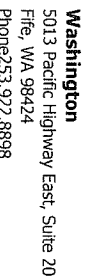
Sub-samples for additional chemistry:

Appendix E
Chain-of-Custody Forms

Sample Collection By:						ANALYSES REQUIRED						
Report to: Company: <u>Birch Bay Water & Sewer</u> Address: <u>7096 Pt Whitehorn Rd</u> City/State/Zip: <u>Blaine WA 98230</u> Contact: <u>Shane Hess</u> Phone: <u>360-371-7100</u> Email: <u>shane@bbwsd.com</u>						Invoice To: Company: <u>Same as Report to</u> Address: _____ City/State/Zip: _____ Contact: _____ Phone: _____ Email: _____						
SAMPLE ID	DATE	TIME	MATRIX	CONTAINER TYPE	NO. OF CONTAINERS	COMMENTS						
1	Final Effluent	1-29-24	9:00	Effluent	plastic	1						
2												
3												
4												
5												
6												
7												
8												
9												
10												

PROJECT INFORMATION			SAMPLE RECEIPT			RELINQUISHED BY (CLIENT)			RELINQUISHED BY (COURIER)		
Client:	<u>Birch Bay Water & Sewer</u>	Total No. of Containers	<u>1</u>	(Signature)	<u>Shane Hess</u>	(Time)	<u>0915</u>	(Signature)		(Time)	
PO No.:	<u>Sewer Dept</u>	Received Good Condition?	<u>Y</u>	(Printed Name)	<u>Shane Hess</u>	(Date)		(Printed Name)		(Date)	
Shipped Via:	<u>Fed Ex</u>	Matches Test Schedule?	<u>Y</u>	(Company)	<u>Birch Bay Water & Sewer</u>	(Company)		(Company)			
SPECIAL INSTRUCTIONS/COMMENTS:			RECEIVED BY (COURIER)			RECEIVED BY (LABORATORY)					
			(Signature)		(Time)			(Signature)		(Time)	
			(Printed Name)		(Date)			(Printed Name)		(Date)	
			(Company)					(Printed Name)		(Date)	
								(Log in #)			

Receipt Temperature (°C)

[illegible]

Sample Collection By: Report to: Company: <u>Birch Bay Water & Sewer</u> Address: <u>7096 Pt Whitehorn Rd</u> City/State/Zip: <u>Blaine WA 98230</u> Contact: <u>Shane Hess</u> Phone: <u>360-371-7100</u> Email: <u>shane@bbwsd.com</u>				Invoice To: Company: _____ Address: _____ City/State/Zip: _____ Contact: _____ Phone: _____ Email: _____				ANALYSES REQUIRED <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%; height: 40px;"></td> <td style="width:25%; height: 40px;"></td> <td style="width:25%; height: 40px;"></td> <td style="width:25%; height: 40px;"></td> </tr> </table>							
Final Effluent 2-2-24 0800 <u>WV Effluent</u> plastic				NO. OF CONTAINERS: <u>1</u>				COMMENTS: <u>Acute + chronic Toxicity</u>							
SAMPLE ID DATE TIME MATRIX CONTAINER TYPE NO. OF CONTAINERS COMMENTS															
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

PROJECT INFORMATION		SAMPLE RECEIPT		RELINQUISHED BY (CLIENT)		RELINQUISHED BY (COURIER)	
Client:	Birch Bay Water & Sewer	Total No. of Containers	1	(Signature)	Shane Hess	(Signature)	Eric Tolbert
					(Date) 0900		(Date) 0925
PO No.:	Sewer Dept	Received Good Condition?	✓	(Printed Name)	Shane Hess	(Printed Name)	ERIC TOLBERT
				(Date)	2-2-24	(Date)	2/3/24
Shipped Via:	Fed Ex	Matches Test Schedule?	✓	(Company)	Birch Bay Water & Sewer	(Company)	
SPECIAL INSTRUCTIONS/COMMENTS:				RECEIVED BY (COURIER)		RECEIVED BY (LABORATORY)	
				(Signature)	(Time)	(Signature)	(Time)
				(Printed Name)	(Date)	(Printed Name)	(Date)
				(Log in #)			

Receipt Temperature (°C)