APPENDIX 1A: TOXICITY LAB REPORT FOR *Chironomus dilutus*

Coeur Alaska, Inc.
Juneau, Alaska

Report of Short-Term Toxicity of Whole Sediment to *Chironomus dilutus*

Prepared by

AECOM Environment
Environmental Toxicology
Fort Collins, CO

60147217-058-(056-058, 060)
September 2010

Report of Short-Term Toxicity of Whole Sediment to Chironomus dilutus

Project IDs: 60147217-058-(056-058, 060)
September 2010

Sponsor and Laboratory Information

Sponsor	Coeur Alaska Inc. Kensington Mine 3031 Clinton Drive Suite 202 Juneau, Alaska 99801
Project Officer	Liz Flory (907) 364-2857
Testing Facility	AECOM Environment Fort Collins Environmental Toxicology Laboratory 4303 West LaPorte Ave. Fort Collins, CO 80521 Fax: (970) 490-2963 State of Florida NELAP Laboratory ID: E87972
Study Director	David A. Pillard (970) 416-0916, email: dave.pillard@aecom.com

Test Information

Test	Short-term chronic screening toxicity test of sediment	
Basis	USEPA (2000) and ASTM (2006)	
Test Protocol	CT3AK.TIE058.008	
Test Period	September 24, 2010 @ 1230 to October 4, 2009 @ 1625	
Test Length	10 days	
Species	*Chironomus dilutus*	
Test Material	Whole sediment	
Sediment ID	Sample ID	AECOM Laboratory ID
	Johnson Creek	23991
	Lower Slate Creek	23997
	Middle Slate Creek	23995
	Sherman Creek	23993
Control Sediments	Silica Sand and Laboratory Formulated Sediment	
Overlying water	Moderately hard reconstituted water prepared according to USEPA (2002), augmented with approximately 50 mg/L Cl^- (as NaCl)	
Test Concentrations	0 (control) and 100% of each test sediment	

- *Results described in this report apply only to the samples submitted to the laboratory and analyzed, as listed in the report*
- *Test results comply with NELAC standards. Reports are intended to be considered in their entirety; AECOM is not responsible for consequences arising from use of a partial report*
- *This report contains 7 pages plus 3 appendices*

Sediment Collection and Receipt

Sample ID	Collection Date and Time	AECOM No.	Date of Receipt	Temp. at Arrival (°C)[a]
Johnson Creek	08/18/10 @ 1415	23991	08/26/10	11.0
Lower Slate Creek	08/11/10 @ 1700	23997	08/26/10	11.0
Middle Slate Creek	08/11/10 @ 1130	23995	08/26/10	11.0
Sherman Creek	08/16/10 @ 1530	23993	08/26/10	11.0

[a] Air temperature of cooler
Note: See Appendix A for copies of chain of custody records

Control Sediment

The primary control sediment was silica sand, obtained from a local commercial supplier. A second control sediment, with a smaller grain size and higher organic matter content, was prepared in the laboratory. The composition of the formulated sediment is given in the following table (Kemble et al. 1999).

Composition of Laboratory Formulated Sediment (Control)

Material	Source	Pre-Treatment	Weight (g)
Quartz Sand	Unimin Corporation, Emmett, ID	Rinsed with gentle mixing in deionized water until water ran clear. Dried in oven.	1242
Silt/Clay (ASP400)	Mozel, St. Louis, MO. Distributor = Englehardt	None	219
Dolomite	Grey Rock Clay Center, Ft. Collins, CO.	None	7.5
α-cellulose	Sigma	None	77.3
Humic Acid	Fluka	None	0.15
Total			1545.95

Test Sediment Preparation

Sample ID	Date Homogenized	Time Homogenized
Johnson Creek	September 23, 2010	1012-1016
Lower Slate Creek		1013-1018
Middle Slate Creek		1032-1036
Sherman Creek		1034-1043

Before, during and after homogenization, debris (including sticks and other plant material) and large stones were removed from the sediment and discarded. Sherman Creek sediment was also passed through sieves (U.S. Standard 11.1 and 2 mm) to remove debris.

Test Conditions

Test Type	Static sediment with continuous replacement of overlying water
Test Duration	10 days
Overlying Water Delivery System	Continuous renewal (flow-through) [a]
Test Endpoints	Survival, AFDW[b] per original and surviving organism
Test Chambers	500 ml plastic beakers
Test Sediment Volume	100 ml
Overlying Water Volume	175 ml
Replicates per Treatment	8
Organisms per Replicate	10
Test Temperature	23 ± 1°C
Lighting	Fluorescent, 16 hours light:8 hours dark
Chamber Placement	Randomized
Test Sediment Renewal	None
Test Overlying Water Renewal	Approximately two volume additions per test chamber per day

[a] Continuous replacement via a drip system
[b] Ash-Free Dry Weight

Test Organism

From the lot of *Chironomus dilutus* received for use in the test, 20 were collected, preserved, and used to determine head capsule widths. The mean head capsule width of lot 10-031 was 0.36 mm and the range was 0.18 to 0.52 mm. Some of the organisms were slightly larger than the upper limit for third instar (0.45 mm). However, all organisms were smaller than the lower limit for fourth instars according to the range given in USEPA (2000). All organisms were, therefore, third instars.

Species and Lot Number	*Chironomus dilutus*, Lot 10-031
Age	3rd instar
Source	Aquatic BioSystems (ABS), Fort Collins, CO
Overlying Water	Moderately Hard Reconstituted Water with added chloride (51 mg/L) as NaCl, RW # 9662
Reference Toxicant Testing	Initiated September 24, 2010 using sodium chloride (NaCl)

TEST RESULTS

Biological Data – Survival and Ash Free Dry Weights

Sample ID	Percent Survival	Ash Free Dry Weight (mg)	
		Per original organism	Per surviving organism
Sand Control	66.25	0.5834	0.8836
Lab. Formulated Sediment Control	70.00	0.8876	1.3018
Johnson Creek	75.00	1.0098	1.4277
Lower Slate Creek	82.50	0.7501	0.9169[b]
Middle Slate Creek	80.00	0.6860[b]	0.8746[b]
Sherman Creek	77.50	0.7758	1.1517
Control Performance	Acceptable[a]	N/A	N/A

[a] The Sand Control did not meet the quality criterion for survival (≥70%). Therefore, all statistical comparisons were made using the Formulated Sediment control.
[b] Significantly lower weight compared to the Formulated Sediment control
Note: See Appendix B for test data sheets

Data Analysis

All statistical comparisons were made against the Formulated Sediment control since the Sand Control did not meet the quality criterion for survival (≥70%).

Biological Endpoint	Comparison[a]	Procedure
Survival	Normality	Inspection
	Homogeneity of Variance	Inspection
	Significant Reduction Relative to the Formulated Sediment Control	Inspection
Growth (AFDW per Original Organism)	Normality	Shapiro-Wilk's Test (α=0.01)
	Homogeneity of Variance	Bartlett's Test (α=0.01)
	Significant Reduction Relative to the Formulated Sediment Control	Dunnett's Test (α = 0.05)
Growth (AFDW per Surviving Organism)	Normality	Shapiro-Wilk's Test (α=0.01)
	Homogeneity of Variance	Bartlett's Test (α=0.01)
	Significant Reduction Relative to the Formulated Sediment Control	Steel's Many-One Rank Test (α = 0.05)

[a] Using Toxstat Version 3.5 (WEST, Inc. and Gulley 1996)

Analytical Data

Parameter	Sample Identification			
	Johnson Creek	Lower Slate Creek	Middle Slate Creek	Sherman Creek
Metals (mg/kg-dry)[a]				
Aluminum	17,400	17,800	22,300	18,100
Chromium	35.9	37.5 J	45.0 J	37.4
Zinc	126	1,920	2,140	126
Arsenic	25.0	38.5	48.8	74.3
Cadmium	0.454	34.8	32.0	0.424
Copper	155	174	203	103
Lead	16.4	13.6	16.6	18.7
Nickel	32.7	152	168	38.7
Selenium	0.296 J	6.00	8.70	0.585
Silver	0.746	0.416 J	0.534 J	0.328
Mercury	0.156 J	0.188 J	0.179 J	0.0757 J
Particle Size (%)[b]				
Clay	18.0	32.0	28.0	7.0
Sand	50.0	34.0	28.0	78.0
Silt	32.0	34.0	44.0	15.0
Texture	Loam	Clay Loam	Clay Loam	Loamy Sand
Coarse Material (≥2 mm)	4.05	5.58	3.03	7.16
TOC (%-dry)[c]	7.86	17.6	18.9	3.10
Acid Volatile Sulfide (umoles/g)	2.08	9.90	5.79	1.93

[a] Al, Cr, and Zn by SW-846 Method 6010B; As, Cd, Cu, Pb, Ni, Se and Ag by SW-846 Method 6020; Hg by SW-846 7471B (USEPA 1986)
[b] Particle size was determined using ASTM Method D422 and Modified ASA 15-5
[c] TOC was determined using the Walkley Black Method
J = The concentration was below the Reporting Limit but above the Method Detection Limit
Note: See Appendix C for a copy of the report from the analytical laboratory (MSE-TA Analytical Laboratory, Butte, MT)

Total and Total Volatile Solids

Sample ID	Percent Total Solids[a]	Percent Total Volatile Solids[b]
Johnson Creek	46.90	13.03
Lower Slate Creek	16.78	30.12
Middle Slate Creek	16.09	27.31
Sherman Creek	66.60	3.87

[a] Total solids were determined using Standard Methods 2540B (APHA 1998)
[b] Total volatile solids were determined using Standard Methods 2540E (APHA 1998)
All values are means of two analyzed samples
Note: See Appendix B for data sheets (these parameters were determined at the AECOM/FCETL)

Physical and Chemical Data (Min/Max)

Sample ID	pH (units)	DO (mg/L)	Cond. (µS/cm)	Temp. (°C)[a]	Ammonia as N (mg/L)	Hardness (mg/L as $CaCO_3$)	Alkalinity (mg/L as $CaCO_3$)
Sand Control	7.7/8.2	5.6/6.9	458/617	22/25	<1.0/1.1	82/114	66/92
Lab. Form. Sed.	7.7/8.1	5.1/6.7	475/606	22/25	<1.0	86/132	67/114
Johnson Creek	7.4/7.9	4.4/6.4	460/641	22/25	1.8/6.3	100/146	82/173
Lower Slate Creek	7.6/8.0	4.7/6.6	452/632	22/25	<1.0/1.6	98/152	77/136
Middle Slate Creek	7.7/8.0	5.0/6.6	456/652	22/25	1.2/2.0	98/172	86/150
Sherman Creek	7.6/8.1	5.1/6.6	445/689	22/25	<1.0/1.8	90/154	69/125

[a] Temperature in test chambers

Reference Toxicant Test Results for *C. dilutus*

Organism Lot Number	Test Dates	96-Hour LC_{50}	AECOM/FCETL Historical 95% Control Limits	
			Low	High
10-031	09/24/10 to 9/28/10	4394	3570	6429

Note: Values are expressed as mg/L chloride

References

APHA. 1998. Standard Methods for the Examination of Water and Wastewater. Amer. Public Health Assoc., Amer. Water Works Assoc., Water Pollut. Control Fed., APHA, Washington, DC.

ASTM. 2006. Standard Test Method for Measuring the Toxicity of Sediment-Associated Contaminants with Fresh Water Invertebrates. Method E 1706-05 In *2006 Annual Book of ASTM Standards, Section 11, Water and Environmental Technology, Volume 11.06, Biological Effects and Environmental Fate; Biotechnology*. American Society of Testing and Materials. Conshohocken, PA.

Kemble, N.E., F.J. Dwyer, C.G. Ingersoll, T.D. Dawson, and T.J. Norberg-King. 1999. Tolerance of Freshwater Test Organisms to Formulated Sediments for Use as Control Materials in Whole-Sediment Toxicity Test. *Environ. Toxicol. Chem.* 18:222-230.

USEPA. 1986. Test Methods for Evaluating Solid Waste. Third Edition. SW-846.

USEPA. 2000. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates. EPA/600/R-99/064.

USEPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition. EPA-821-R-02-012.

WEST, Inc. and D.D. Gulley. 1996. Toxstat Version 3.5. Western EcoSystems Technology, Inc., Cheyenne, WY.

Statement of Procedural Compliance

I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge, accurate and complete.

David A. Pillard 29 Nov 2010

David A. Pillard, Ph.D. Date
Study Director

Statement of Quality Assurance

The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with standard operating procedures, and that the resulting data and report meet the requirements of the NELAC standards. This report is an accurate reflection of the raw data.

Anita Rehner November 29, 2010

Quality Assurance Unit Date

APPENDIX A

Chain of Custody

AECOM

CHAIN OF CUSTODY RECORD

Page ____ of ____

Client/Project Name: COEUR ALASKA

Project Location: JUNEAU, ALASKA

Project Number: KENSINGTON 2010

Field Logbook No.:

Sampler (Print Name)/(Affiliation): LIZ FLORY, AQUATIC SCIENCE INC.

Chain of Custody Tape Nos.: 42389 (intact)

Signature: Liz Flory

Send Results/Report to: LIZ FLORY, lizflory@msn.com

TAT: 30 DAYS

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	METALS	TOXICITY		Lab I.D.	Remarks
JOHNSON CREEK	8-18-10	14:15	X		GLASS	SEDIMENT	COOL	NO	✓		rec. 2x analytical	23992	
JOHNSON CREEK	8-18-10	14:15	X		4L POLY	SEDIMENT	COOL	NO		✓		23991	
SHERMAN CREEK	8-16-10	15:30	X		GLASS	SD	COOL	NO	✓		rec. 2x analytical	23994	
SHERMAN CREEK 1+2	8-16-10	15:30	X		2x 4L POLY	SD	COOL	NO		✓	rec. 2x 4L jars	23993	
MIDDLE SLATE	8-11-10	11:30	X		GLASS	SD	COOL	NO	✓			239956 ①	
MIDDLE SLATE	8-11-10	11:30	X		4L POLY	SD	COOL	NO		✓		239965	
LOWER SLATE	8-11-10	17:00	X		GLASS	SD	COOL	NO	✓			23998	
LOWER SLATE	8-11-10	17:00	X		4L POLY	SD	COOL	NO		✓		23997	

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
Liz Flory Signature:	Date: 8/24/10 Time: 1230	Ashley Romero (FCETL) Signature: Ashley Romero	Date: 8/24/10 Time: 1615
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): Cooler temp: 11.0°C Recieved on ice

AECOM Toxicology Lab
4303 W. Laporte Avenue
Fort Collins, CO 80521
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via: UPS FedEx Courier Other

Temp blank: Yes No

Serial No. 050468

① 08/26/10E

APPENDIX B

Data Sheets

DAP 11/29/10
QA: AR 10/28/10

H. azteca **10-day Survival and Growth, Testing Cover Page**

Project Number: 60147217-058- 056-058, 060
Protocol #: CT3AK.TIE058.008
Test Substance: Sediment
Test Species: *C. dilutus** (Chironomus) Lot #: 10-031 Age: ~~2nd~~ 3rd instar Supplier: ABS

Test Type: Chronic, Static Renewal
Overlying Water: ~~Reconstituted Fresh Water (Smith et al., 1997)~~ 3
Investigators: CW/ES/MP/AMM/KB/JK/JL/DAP
Sampling Date(s):
Sampling Time(s):
FCETL Sample #(s): 23991, 23997, 23995, 23993
Test Initiation Date/Time: 9/24/10 @ 1000-1230
Test Termination Date/Time: 10/4/10 @ 0930-1625

Renewal Frequency: Cont. drip, 2+ vol/day Feeding Freq: daily Food Type/Amount: 1.5 ml of 4 g/L Tetrafin Test Temp: 23 +/- 1 deg C
Test Chamber Capacity: 500 ml Test Soltn. Vol: 100 mL sed/175 mL H2O # Repl's/Trtmnt: 8
Test Duration: 10 days # Org.'s/Repl: 10 Env. Chmbr/Bath 3

Water Characterization: Minimum of Hardness, Alkalinity, & Conductivity on days 0 and 10; Ammonia on days 0, 3, 7, and 10; No TRC; pH, temperature & DO daily on overlying water
aerate if dissolved oxygen <2.5 mg/L

Test Sediment (s):

1) Sand (cont)
2) Form sed (cont)
3) Johnson Creek ~~(057)~~ 3
4) Lower Slate Cr ~~(056)~~ 3
5) Slate Creek ~~(058)~~ 2
6) ~~Middle~~ Sherman ~~(060)~~ 3 (4)
7)
8) 3
9) 3
10)
11)

Reference Tox. Dates: 9/24/10 - 9/28/10 LC50: 4394 mg/L CR Hist. Limits: 3570-6429 Method: S-K
Study Director Initials: DAP Date: 9/23/10

Overlying water added at a minimum of 2 volume additions/day; equivalent to >350 ml/day or >0.24 ml/min
* formerly known as *C. tentans*

(1) DAP 10/11/10 E
(2) DAP 11/29/10 E, slate creek = middle slate on COC
(3) DAP 11/29/10 E
(4) DAP 11/29/10 (Sherman = combination of lower and middle sherman sediment)

BIOLOGICAL DATA 10/04/10 | *C. dilutus** | Chronic, Static Renewal | Project 60147217-058- 056-058, 060

Sediment	Test Termination	A	B	C	D	E	F	G	H	Remarks:
Sand (cont)	# Surviving	7	7	6	7	5	6	8*	7	*1 pupating 66.25%
	# Observed Dead	0	0	0	0	0	1	0	0	
	# Not Found	3	3	4	3	5	3	2	3	
	Initials	CW	ES	CW	ES	CW	ES	CW	ES	
Form sed (cont)	# Surviving	5	8	①~~7~~8	9	5	6	7	8	
	# Observed Dead	0	0	0	0	0	0	0	0	70% Survival
	# Not Found	5	2	⑤~~3~~2	1	5	⑤~~0~~4	3	2	
	Initials	~~AP~~	CW	ES	DAP	~~AP~~	AP	~~AP~~	~~AP~~	
Johnson Creek (057)	# Surviving	10	7②	6*	9*	~~8~~9	9	4	~~7~~8	②2 pupating *1 pupae
	# Observed Dead	0	0	0	0	0	0	1	0	△1 exuviae 75%
	# Not Found	0	3	4	1	3	1	5	2	
	Initials	CW	ES	CW	ES	AP	DAP	~~AP~~	~~AP~~	
Lower Slate Cr (056)	# Surviving	8	9	7	10	9	7	8	8	82.5%
	# Observed Dead	0	0	0	0	0	0	0	0	
	# Not Found	2	1	3	0	1	3	2	2	
	Initials	CW	ES	ES	ES	DAP	CW	~~AP~~	~~AP~~	
middle Slate Creek (058)	# Surviving	8	7	9	9	10	9	6	6	80%
	# Observed Dead	0	0	0	0	0	0	0	1	
	# Not Found	2	3	1	1	0	1	4	3	
	Initials	CW	DAP	ES	AP	AP	~~AP~~	DAP	~~AP~~	
⑤ ~~Middle~~ Sherman (060)	# Surviving	9	10△	9°	③~~3~~	6④	9	10	6④	△2 pupating, 2 exuviae, °1 exuviae, ⑤1 pupae, 1 exuviae
	# Observed Dead	0	0	0	0	0	0	0	0	77.5%
	# Not Found	1	0	1	7	4	1	0	4	
	Initials	CW	ES	ES	DAP	ES	GMM	GMM	AP	
0	# Surviving									
	# Observed Dead									
	# Not Found									
0	# Surviving									
	# Observed Dead									
	# Not Found									
0	# Surviving									
	# Observed Dead									
	# Not Found									
0	# Surviving									
	# Observed Dead									
	# Not Found									
	# Surviving									
	# Observed Dead									
	# Not Found									

① DAP 10/4/10 E
② AP 10/4/10 E
③ 1 live pupae, excluded fr. wt. (DAP)
④ 1 live pupae excluded from weights (AP)
⑤ ~~AP~~ 11/29/10 E

Qa: AR 10/28/10

CHEMICAL DATA (Composite of Overlying Water) *C. dilutus** Chronic, Static Renewal Project 60147217-058- 056-058, 060

KB 11/29/10

Parameter	Sediment	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day	Meter	Date	Time	Initials
Dissolved	Sand (cont)	6.9	6.5	6.0	6.3	6.1	5.6	5.9	6.4	6.3	6.1	6.4	0	5	9/24/10	0930	CW
Oxygen	Form sed (cont)	6.7	5.9	6.1	5.9	5.8	5.1	5.5	5.6	5.9	5.2	6.3	1	5	9/25/10	0930	[illegible]
(mg/l)	Johnson Creek (057)	6.4	5.0	6.0	5.2	5.0	4.4	5.3	5.7	4.8	4.6	5.4	2	5	9/26/10	1420	[illegible]
	Lower Slate Cr (056)	6.6	5.3	5.8	5.1	5.5	4.7	5.2	5.2	5.2	5.0	6.3	3	5	9/27/10	1025	AM
middle	Slate Creek (058)	6.6	5.4	5.9	5.0	5.2	5.0	5.4	5.5	5.5	5.2	5.9	4	5	9/28/10	1015	[illegible]
②	~~Middle~~ Sherman (060)	6.6	5.1	6.2	5.2	5.5	5.1	5.4	5.6	5.6	5.2	5.7	5	5	9/29/10	0950	AM
													6	5	9/30/10	1100	KB
													7	5	10/1/10	1545	KB
	0												8	5	10/2/10	1540	[illegible]
	0												9	5	10/3/10	1015	AM
	0												10	5	10/4/10	0915	ES
	0																
	Replicate	A	B	C	D	E	F	G	H	A	B	C					
Temp	Sand (cont)	23	23	25	24	25	24	23	24	24	22	22	0	D47	9/24/10	0930	CW
	Form sed (cont)	23	23	25	24	24	24	23	23	23	22	22	1	D48	9/25/10	0930	[illegible]
(deg C)	Johnson Creek (057)	23	23	25	24	25	24	22	23	23	22	22	2	D47	9/26/10	1410	[illegible]
	Lower Slate Cr (056)	23	23	25	24	24	24	22	23	23	22	22	3	D47	9/27/10	1025	AM
middle	Slate Creek (058)	23	23	25	24	25	24	22	23	23	22	22	4	D47	9/28/10	1010	[illegible]
②	~~Middle~~ Sherman (060)	23	23	25	24	25	24	22	23	23	22	22	5	D46	9/29/10	0950	AM
													6	D47	9/30/10	1100	KB
													7	D47	10/1/10	1545	KB
	0												8	D46	10/2/10	1540	[illegible]
	0												9	D47	10/3/10	1015	AM
													10	D47	10/4/10	0915	ES
	0																
	0																
	Replicate	A	B	C	D	E	F	G	H	A	B	C					
pH	Sand (cont)	8.2	8.2	8.1	7.9	7.9	7.7	7.9	8.1	8.0	7.8	8.2	0	12	9/24/10	0930	CW
	Form sed (cont)	8.1	8.1	8.1	7.9	7.8	7.7	8.0	7.9	7.9	7.7	8.1	1	12	9/25/10	0930	[illegible]
	Johnson Creek (057)	7.7	7.7	7.6	7.4	7.6	7.5	7.9	7.8	7.8	7.6	7.8	2	12	9/26/10	1420	[illegible]
	Lower Slate Cr (056)	8.0	8.0	7.8	7.6	7.7	7.8	7.8	7.9	7.8	7.7	7.8	3	12	9/27/10	1025	AM
middle	Slate Creek (058)	8.0	7.8	7.7	7.7	7.9	7.7	7.9	7.9	7.8	7.8	7.7	4	12	9/28/10	1015	[illegible]
②	~~Middle~~ Sherman (060)	8.0	7.8	7.9	7.6	7.7	7.7	8.0	8.1	7.9	7.7	7.8	5	12	9/29/10	0950	AM
	0												6	12	9/30/10	1100	KB
	0												7	12	10/1/10	1545	KB
	0												8	12	10/2/10	1540	[illegible]
	0												9	12	10/3/10	1015	AM
	Replicate	A	B	C	D	E	F	G	H	A	B	C	10	12	10/4/10	0915	ES

① KB 9/30/10 E

② [illegible] 11/29/10 E

OVERLYING WATER CHARACTERIZATION | *C. dilutus** | Chronic, Static Renewal | Project No. 60147217-058- 056-058, 060

QA: AR 10/28/10

Sediment	Conductivity (s/cm) Day 0	Conductivity (s/cm) Day 10	Hardness (mg/L as CaCO3) Day 0	Hardness (mg/L as CaCO3) Day 10	Alkalinity (mg/l as CaCO3) Day 0	Alkalinity (mg/l as CaCO3) Day 10	Ammonia (mg/l) Day 0	Ammonia (mg/l) Day 3	Ammonia (mg/l) Day 7	Ammonia (mg/l) Day 10
Sand (cont)	458	617	82	114	66	92	<1.0	NM	NM	1.1
Form sed (cont)	475	606	86	132	67	114	<1.0	NM	NM	<1.0
Johnson Creek (057)	460	641	100	146	82	173	1.8	NM	NM	6.3
Lower Slate Cr (056)	452	682	98	152	77	136	<1.0	NM	NM	1.6
middle Slate Creek (058)	456	652	98	172	86	150	1.2	NM	NM	2.0
① ~~Middle~~ Sherman (060)	445	689	90	154	69	125	<1.0	NM	NM	1.8
										~~<1.0~~ ①
0										
Overlying water 9/23/10	434		80		63		<1.0 ⊗			
(RW 9662)										
0										
Cl^- = 50.8 mg/L										
Meter #	15	15	Titr.	Titr.	Titr.	Titr.	HA#1			HA#1
Date:	9/24/10	10/4/10	9/24/10	10/4/10	9/24/10	10/4/10	9/24/10			10/4/10
Time:	1400	1400	1400	1400	1400	1400	1400			1400
Initials:	cw for JC	cw for JC	cw for JC	cw for JC	cw for JC	cw for JC	cw for JC			cw for JC

⊗ Measured in source water

① 11/29/10

DAILY TESTING LOG | *C. dilutus** | Chronic, Static Renewal | Project No. 60147217-058- 056-058, 060

QA: AR 10/28/10

Day -1				9/23/10 ES/cw
Day 0	Bath CT = 22.2 °C	Range = 19.2 - 24.6 °C	Feeding: @ 1300 cw	Initials/Date: cw/ES 9/24/10
	Test organisms added: 1000 - 1230			
Day 1	Bath CT = 24.8 °C	Range = 24 - 25.8 °C	Feeding: @ 1615 AP	Initials/Date: 9/25/10
Day 2	Bath CT = 24.8 °C	Range = 24.4 - 25.2 °C	Feeding: @ 1515	Initials/Date: 9/26/10
Day 3	Bath CT = 24.8 °C	Range = 24.4 - 25.2 °C	Feeding: @ 1650	Initials/Date: AM 9/27/10
Day 4	Bath CT = 24.8 °C	Range = 24.4 - 25.2 °C	Feeding: @ 1650	Initials/Date: 9/28/10
Day 5	Bath CT = 24.8 °C	Range = 24.8 - 25.2 °C	Feeding: @ 1680	Initials/Date: AM 9/29/10
Day 6	Bath CT = 24.8 °C	Range = 24.4 - 24.8 °C	Feeding: @ 1530	Initials/Date: KB 9/30/10
Day 7	Bath CT = 24.8	Range = 24.4 - 24.2	Feeding: @ 1650	Initials/Date: KB 10/1/10
Day 8	Bath CT = 24.8 °C	Range = 24.4 - 25.2 °C	Feeding: @ 1610	Initials/Date: 10/2/10
Day 9	Bath CT = 24.6 °C	Range = 24.4 - 24.8 °C	Feeding: @ 1600	Initials/Date: AM 10/3/10
Day 10	Bath CT = 24.6 °C	Range = 24.1 - 25.2 °C	Feeding: None	Initials/Date: ES/cw 10/4/10

@KB 10/1/10 E

057 SEDIMENT/SOIL PREPARATION

60147217-058 - (056, 058, 060)

Artificial soil	
Constituent/source	**Amount added (g)**
Coarse Silica Sand	1242
Silt/Clay (ASP 400)	219
Dolomite	7.5
α-cellulose	77.3
Humic Acid	0.15
Total	1545.95

Notes: Container was placed into tumbler for a minimum of an hour to homogenize prior to use

Soil/sediment	FCETL#	Homogenization			
		Date	From	To	Analyst
Johnson Creek *	23991	09/23/10	① ~~0945~~ 1012	1016	ES
Lower Slate Creek *	23997	09/23/10	1013	1018	CW
Middle Slate Creek *	23995	09/23/10	1032	1036	ES
② ~~Middle~~ Sherman Creek *	23993	09/23/10	1034	1043	CW
Sand Cont.		09/23/10	0954	0957	CW
Form. Sed.		09/23/10	0953	0956	ES

*sticks were removed from sample

① ES 9/23/10 WP

② MR for (?) 10/28/10 E

Length/Width of Objects Using a Micrometer

QA: AR 10/28/10

Project/Study Number: 60147217-058 (056 057 058 060)	Project Name: Coeur
Study Initiation Date: 9/24/10	Species: C. dilutus
Source of Organisms: ABS	Organism Batch/Lot #: 10-031
Collected by: ES	Date Collected: 9/24/10
Analyzed by: ES	Date Analyzed: 10/15/10

Specimen Number	Magnif.	# of Squares	Length of One Square (mm)	Total (mm)	Remarks
1	40x	2.0	0.175	0.35	
2	40x	2.5		0.44	
3	40x	2.5		0.44	
4	40x	2.75		0.48	
5	40x	3.0		0.52	
6	40x	3.0		0.52	
7	40x	3.0		0.52	
8	40x	1.0		0.18	
9	40x	1.46 ①		0.28	
10	40x	1.0		0.18	
11	40x	2.5		0.44	
12	40x	1.0		0.18	
13	40x	2.5		0.44	
14	40x	1.5		0.26	
15	40x	1.9		0.33	
16	40x	1.25		0.22	
17	40x	1.9		0.33	
18	40x	3.0		0.52	
19	40x	1.5		0.26	
20	40x	1.6		0.28	
Total				7.17	
Mean				0.36	

① ES 10/15/10 E

3rd instar = 0.33–0.45 mm

FCETL QA Form No.108
Revision 0
Effective 08/99

QA: AR 10/19/10
SK 11/29/10

TEST ORGANISM DRY WEIGHT AND ASH-FREE DRY WEIGHT (AFDW)

studies 056, 057, 058, 060

Project No: 60147217-058
Species: C. ~~tetrans~~ dilutus
Lot/Batch No.: 10-031
Analytical Balance ID: SART

TARE: Date/time: 10/5/10 @1120 Analyst: SK
DRY GROSS: Date/time: 10/6/10 @1335 Analyst: ES
ASHED GROSS: Date/time: 10/7/10 @1530 Analyst: ES

Dried in Oven # 3 from Date: 10/5/10 Time: 1235
Oven °C: 60-90°C to Date: 10/6/10 Time: 1230
Ashed in Furnace from Date: 10/6/10 Time: ① ~~1635~~ 1435
Furnace °C: 550 to Date: 10/6/10 Time: 1705

Indicate mean weight is **Dry Weight** or **AFDW** (Circle one)

Boat No.	Treatment	Rep	Tare Weight (g) A	Dry Gross Weight (g) B	Dry Net Weight (g) (B-A)	Adjusted Dry Net Weight (g)[1]	Ashed Gross Weight (g) (D)	AFDW (g) (B-D)	No. of Original Org.	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Org.	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
1	Sand	A	1.98755	1.99412	0.00657		1.98833	0.00579				7		
2		B	2.20269	2.20901	0.00632		2.20349	0.00552				7		
3		C	1.88498	1.88907	0.00409		1.88521	0.00386				6		
4		D	2.22818	2.23538	0.00720		2.22894	0.00644				7		
5		E	2.21521	2.22030	0.00509		2.21559	0.00471				5		
6		F	2.14743	2.15402	0.00659		2.14787	0.00615				6		
7		G	2.56432	2.57167	0.00735		2.56498	0.00669	9*			7		
8		H	2.22208	2.23138	0.00930		2.22461	0.00677				7		
9	Form.	A	2.19548	2.20664	0.01116		2.19825	0.00839				5		
10		B	1.93436	1.94888	0.01452		1.93835	0.01053				8		
11		C	2.22966	2.24175	0.01209		2.23252	0.00923				8		
12		D	2.23111	2.24521	0.01410		2.23552	0.00969				9		
13		E	2.17948	2.19053	0.01105		2.18211	0.00842				5		
Blank			2.20596	2.20598	0.00002		2.20604	+0.00006						

[1] Add in weight loss of blank boat, if appropriate.

Note: Crucibles 1-25 were ashed with Blank A, (DAP)
26-48 ashed with Blank B. * 1 pupae

② AR for ES 10/19/10 CF

① ES 10/6/10

Studies 056, 057, 058, 060

TEST ORGANISM DRY WEIGHT AND ASH-FREE DRY WEIGHT (AFDW)

QA: AR 10/19/10 ~~AR~~ 11/22/10

Project No: 60477217-058
Species: C. ~~tetanus~~ dilutus (2)
Lot/Batch No.: 10-031
Analytical Balance ID: SART

TARE: Date/time: 10/5/10 @ 1120 Analyst: *
DRY GROSS: Date/time: 10/6/10 @ 1335 Analyst: ES
ASHED GROSS: Date/time: 10/7/10 @ 1530 Analyst: ES

Dried in Oven # 3 from Date: 10/5/10 Time: 1235
Oven °C: 60-90°C to Date: 10/6/10 Time: 1230
Ashed in Furnace from Date: 10/6/10 Time: (1) ~~1035~~ 1435
Furnace °C: 550 to Date: 10/6/10 Time: 1705

Indicate mean weight is **Dry Weight** or **AFDW** (Circle one)

Boat No.	Treatment	Rep	Tare Weight (g) A	Dry Gross Weight (g) B	Dry Net Weight (g) (B-A)	Adjusted Dry Net Weight (g)[1]	Ashed Gross Weight (g) (D)	AFDW (g) (B-D)	No. of Original Org.	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Org.	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
14	Form.	F	1.82569	1.83364	0.00795		1.82728	0.00636				6		
15		G	2.29082	2.30206	0.01124		2.29385	0.00821				7		
16		H	1.93994	1.95533	0.01539		1.94515	0.01018				8		
17	Johnson	A	2.29286	2.31045	0.01759		2.29709	0.01336				10		
18		B	2.23681	2.24900	0.01219		2.24017	0.00883	8*			5		
19		C	2.11451	2.12522	0.01071		2.11780	0.00742	9▲			5		
20		D	2.32372	2.33930	0.01558		2.32935	0.00995	9▲			8		
21		E	1.87361	1.88515	0.01154		1.87754	0.00761	9⊛			6		
22		F	1.82772	1.84466	0.01694		1.83385	0.01081				9		
23		G	2.07901	2.08885	0.00984		2.08169	0.00716				4		
24		H	2.32523	2.34137	0.01614		2.33071	0.01066				8		
25	lower state	A	2.30192	2.31033	0.00841		2.30322	0.00711				8		
26		B	2.27452	2.28422	0.00970		2.27602	0.00820				9		
B Blank			1.99125	1.99124	-0.00001		1.99130	+0.00006						

[1] Add in weight loss of blank boat, if appropriate.

(1) ES 10/7/10
(2) Before ES 10/19/10 CF

⊛ luxuriant
* 2 purple
▲ lavender

Note: Crucibles 1-25 were ashed with Blank A, 26-48 ashed with Blank B (DAP)

studies 056, 057, 058, 060

TEST ORGANISM DRY WEIGHT AND ASH-FREE DRY WEIGHT (AFDW)

QA: AR 10/19/10 ✱ 11/29/10

Project No: 60147217-058
TARE: Date/time: 10/5/10 @ 1120 Analyst: ✱
Dried in Oven # 3 from Date: 10/5/10 Time: 1235 to Date: 10/6/10 Time: 1230
Oven °C: 60-90

Species: C. ~~tentans~~ dilutus ③
Lot/Batch No.: 10-031
DRY GROSS: Date/time: 10/6/10 @ 1335 Analyst: ES
Ashed in Furnace from Date: 10/6/10 Time: ~~1035~~ 1435 to Date: 10/6/10 Time: 1705
Furnace °C: 550

Analytical Balance ID: SART
ASHED GROSS: Date/time: 10/7/10 @ 1530 Analyst: ES

Indicate mean weight is **Dry Weight** or **AFDW** (Circle one)

Boat No.	Treatment	Rep	Tare Weight (g) A	Dry Gross Weight (g) B	Dry Net Weight (g) (B-A)	Adjusted Dry Net Weight (g)[1]	Ashed Gross Weight (g) (D)	AFDW (g) (B-D)	No. of Original Org.	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Org.	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
27	lower slate	C	1.98077	1.99034	0.00957		1.98238	0.00796				7		
28		D	2.06902	2.08002	0.01100		2.07114	0.00888				10		
29		E	2.03744	2.04599	0.00855		2.03921	0.00678				9		
30		F	2.05888	2.06681	0.00793		2.05998	0.00683				7		
31		G	2.23126	2.24081	0.00955		2.23312	0.00769				8		
32		H	1.85407	1.86256	0.00849		1.85600	0.00656				8		
33	middle slate	A	2.24632	2.25365	0.00733		2.24787	0.00578				8		
34		B	1.82235	1.83028	0.00793		1.82375	0.00653				7		
35		C	2.08127	2.09181	0.01054		2.08343	0.00838				9		
36		D	1.95059	1.95897	0.00838		1.95192	0.00705				9		
37		E	1.87727	1.88690	0.00963		1.87870	0.00820				10		
38		F	1.97779	1.98561	0.00782		1.97932	0.00629				9		
39		G	1.94704	~~1.99777~~ ①	0.00831		1.94841	0.00914				6		
Blank				1.95535										

[1] Add in weight loss of blank boat, if appropriate.

③ AR for ES 10/19/10 CF

① ES 10/6/10 WP ② ES 10/7/10 E

TEST ORGANISM DRY WEIGHT AND ASH-FREE DRY WEIGHT (AFDW)

Studies 056, 057, 058, 060

QA: AR 10/19/10 [illegible] 11/29/10

Project No: 60147277-058
Species: C. ~~tetans~~ dilutus
Lot/Batch No.: 10-081
Analytical Balance ID: SART

TARE: Date/time: 10/5/10 @1120 Analyst: [illegible]
DRY GROSS: Date/time: 10/6/10 @1335 Analyst: ES
ASHED GROSS: Date/time: 10/7/10 @1530 Analyst: ES

Dried in Oven # 3 from Date: 10/5/10 Time: 1235
Oven °C: 60-90 to Date: 10/6/10 Time: 1230
Ashed in Furnace from Date: 10/6/10 Time: ~~1635~~ 1435
Furnace °C: 550 to Date: 10/6/10 Time: 1705

Indicate mean weight is **Dry Weight** or **AFDW** (Circle one)

Boat No.	Treatment	Rep	Tare Weight (g) A	Dry Gross Weight (g) B	Dry Net Weight (g) (B-A)	Adjusted Dry Net Weight (g)[1]	Ashed Gross Weight (g) (D)	AFDW (g) (B-D)	No. of Original Org.	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Org.	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
40	Slate	H	1.75881	1.76570	0.00689		1.75999	0.00571				6		
41	~~Middle~~ (14) Sherman	A	2.26869	2.28354	0.01485		2.27385	0.00969				9		
42		B	1.93580	1.94561	0.00981		1.93979	0.00582	8*			(3) ~~9~~ 8		
43		C	2.21724	2.22953	0.01229		2.22185	0.00768	9▲			8		
44		D	2.24501	2.25026	0.00525		2.24622	0.00404	9*			2		
45		E	2.18224	2.18879	0.00655		2.18465	0.00414	8(A)			4		
46		F	1.87044	1.88662	0.01618		1.87702	0.00960				9		
47		G	1.87600	1.89195	0.01595		1.88213	0.00982				10		
48		H	1.98053	1.99177	0.01124		1.98504	0.00673	9(*)			5		
(1) ~~49~~														
(1) ~~50~~														
Blank														

[1] Add in weight loss of blank boat, if appropriate.

(14) AR for ES 10/19/10 CF

* 2 purge
▲ 1 extra
(*) 1 purge

(A) 1 purge, 1 extra

(1) ES 10/5/10 E: not used

(2) ES 10/7/10 E: [illegible]

SKilbay/10

QA: AR 10/19/10

Spreadsheet for AFDW

Test Start Date:	9/24/2010			Test End Date:	10/4/2010
Test Number(s):	60147217-058-(056-058, 060)			Test Material:	Sediment
Species:	*C. dilutus*			Entered by:	Kelly Tapp

Boat #	Treatment	Rep	Tare wt (dry) (g)	Gross wt (dry) (g)	Dry net wt (g)	Dry adjusted net wt (g)	Ashed gross wt (g)	AFDW (g)	Adjusted AFDW (g)	Number original organisms	Mean wt per orig (mg)	Mean wt per treatment (orig) (mg)	Number surviving	Mean wt per surviving	Mean wt per treatment (surv) (mg)
1	Sand cont	A	1.98755	1.99412	0.00657	0.00657	1.98833	0.00579	0.00579	10	0.5790	0.5834	7	0.8271	0.8836
2	Sand cont	B	2.20269	2.20901	0.00632	0.00632	2.20349	0.00552	0.00552	10	0.5520		7	0.7886	
3	Sand cont	C	1.88498	1.88907	0.00409	0.00409	1.88521	0.00386	0.00386	10	0.3860		6	0.6433	
4	Sand cont	D	2.22818	2.23538	0.00720	0.00720	2.22894	0.00644	0.00644	10	0.6440		7	0.9200	
5	Sand cont	E	2.21521	2.22030	0.00509	0.00509	2.21559	0.00471	0.00471	10	0.4710		5	0.9420	
6	Sand cont	F	2.14743	2.15402	0.00659	0.00659	2.14787	0.00615	0.00615	10	0.6150		6	1.0250	
7	Sand cont	G	2.56432	2.57167	0.00735	0.00735	2.56498	0.00669	0.00669	9	0.7433		7	0.9557	
8	Sand cont	H	2.22208	2.23138	0.00930	0.00930	2.22461	0.00677	0.00677	10	0.6770		7	0.9671	
9	Form sed	A	2.19548	2.20664	0.01116	0.01116	2.19825	0.00839	0.00839	10	0.8390	0.8876	5	1.6780	1.3018
10	Form sed	B	1.93436	1.94888	0.01452	0.01452	1.93835	0.01053	0.01053	10	1.0530		8	1.3162	
11	Form sed	C	2.22966	2.24175	0.01209	0.01209	2.23252	0.00923	0.00923	10	0.9230		8	1.1538	
12	Form sed	D	2.23111	2.24521	0.01410	0.01410	2.23552	0.00969	0.00969	10	0.9690		9	1.0767	
13	Form sed	E	2.17948	2.19053	0.01105	0.01105	2.18211	0.00842	0.00842	10	0.8420		5	1.6840	
14	Form sed	F	1.82569	1.83364	0.00795	0.00795	1.82728	0.00636	0.00636	10	0.6360		6	1.0600	
15	Form sed	G	2.29082	2.30206	0.01124	0.01124	2.29385	0.00821	0.00821	10	0.8210		7	1.1729	
16	Form sed	H	1.93994	1.95533	0.01539	0.01539	1.94515	0.01018	0.01018	10	1.0180		8	1.2725	
17	Johnson	A	2.29286	2.31045	0.01759	0.01759	2.29709	0.01336	0.01336	10	1.3360	1.0098	10	1.3360	1.4277
18	Johnson	B	2.23681	2.24900	0.01219	0.01219	2.24017	0.00883	0.00883	8	1.1038		5	1.7660	
19	Johnson	C	2.11451	2.12522	0.01071	0.01071	2.11780	0.00742	0.00742	9	0.8244		5	1.4840	
20	Johnson	D	2.32372	2.33930	0.01558	0.01558	2.32935	0.00995	0.00995	9	1.1056		8	1.2438	
21	Johnson	E	1.87361	1.88515	0.01154	0.01154	1.87754	0.00761	0.00761	9	0.8456		6	1.2683	
22	Johnson	F	1.82772	1.84466	0.01694	0.01694	1.83385	0.01081	0.01081	10	1.0810		9	1.2011	
23	Johnson	G	2.07901	2.08885	0.00984	0.00984	2.08169	0.00716	0.00716	10	0.7160		4	1.7900	
24	Johnson	H	2.32523	2.34137	0.01614	0.01614	2.33071	0.01066	0.01066	10	1.0660		8	1.3325	
25	Lower State	A	2.30192	2.31033	0.00841	0.00841	2.30322	0.00711	0.00711	10	0.7110	-	8	0.8887	-
Blank	A		2.20596	2.20598	2E-05		2.20604	0.00006							

11/29/10

QA: AR 10/19/10

Spreadsheet for AFDW

Test Start Date:	9/24/2010			Test End Date:	10/4/2010
Test Number(s):	60147217-058-(056-058, 060)			Test Material:	Sediment
Species:	*C. dilutus*			Entered by:	Kelly Tapp

Boat #	Treatment	Rep	Tare wt (dry) (g)	Gross wt (dry) (g)	Dry net wt (g)	Dry adjusted net wt (g)	Ashed gross wt (g)	AFDW (g)	Adjusted AFDW (g)	Number original organisms	Mean wt per orig (mg)	Mean wt per treatment (orig) (mg)	Number surviving	Mean wt per surviving	Mean wt per treatment (surv) (mg)
* 1	Lower Slate	A	2.30192	2.31033	0.00841	0.00841	2.30322	0.00711	0.00711	10	0.7110	0.7501	8	0.8887	0.9169
2	Lower Slate	B	2.27452	2.28422	0.00970	0.00971	2.27602	0.00820	0.00820	10	0.8200	-	9	0.9111	-
3	Lower Slate	C	1.98077	1.99034	0.00957	0.00958	1.98238	0.00796	0.00796	10	0.7960	-	7	1.1371	-
4	Lower Slate	D	2.06902	2.08002	0.01100	0.01101	2.07114	0.00888	0.00888	10	0.8880	-	10	0.8880	-
5	Lower Slate	E	2.03744	2.04599	0.00855	0.00856	2.03921	0.00678	0.00678	10	0.6780	-	9	0.7533	-
6	Lower Slate	F	2.05888	2.06681	0.00793	0.00794	2.05998	0.00683	0.00683	10	0.6830	-	7	0.9757	-
7	Lower Slate	G	2.23126	2.24081	0.00955	0.00956	2.23312	0.00769	0.00769	10	0.7690	-	8	0.9613	-
8	Lower Slate	H	1.85407	1.86256	0.00849	0.00850	1.85600	0.00656	0.00656	10	0.6560		8	0.8200	
9	Slate Creek	A	2.24632	2.25365	0.00733	0.00734	2.24787	0.00578	0.00578	10	0.5780	0.6860	8	0.7225	0.8746
10	Slate Creek	B	1.82235	1.83028	0.00793	0.00794	1.82375	0.00653	0.00653	10	0.6530	-	7	0.9329	-
11	Slate Creek	C	2.08127	2.09181	0.01054	0.01055	2.08343	0.00838	0.00838	10	0.8380	-	9	0.9311	-
12	Slate Creek	D	1.95059	1.95897	0.00838	0.00839	1.95192	0.00705	0.00705	10	0.7050	-	9	0.7833	-
13	Slate Creek	E	1.87727	1.88690	0.00963	0.00964	1.87870	0.00820	0.00820	10	0.8200	-	10	0.8200	-
14	Slate Creek	F	1.97779	1.98561	0.00782	0.00783	1.97932	0.00629	0.00629	10	0.6290	-	9	0.6989	-
15	Slate Creek	G	1.94704	1.95535	0.00831	0.00832	1.94841	0.00694	0.00694	10	0.6940	-	6	1.1567	-
16	Slate Creek	H	1.75881	1.76570	0.00689	0.00690	1.75999	0.00571	0.00571	10	0.5710		6	0.9517	
17	Middle Sherman	A	2.26869	2.28354	0.01485	0.01486	2.27385	0.00969	0.00969	10	0.9690	0.7758	9	1.0767	1.1517
18	Middle Sherman	B	1.93580	1.94561	0.00981	0.00982	1.93979	0.00582	0.00582	8	0.7275	-	8	0.7275	-
19	Middle Sherman	C	2.21724	2.22953	0.01229	0.01230	2.22185	0.00768	0.00768	9	0.8533	-	8	0.9600	-
20	Middle Sherman	D	2.24501	2.25026	0.00525	0.00526	2.24622	0.00404	0.00404	9	0.4489	-	2	2.0200	-
21	Middle Sherman	E	2.18224	2.18879	0.00655	0.00656	2.18465	0.00414	0.00414	8	0.5175	-	4	1.0350	-
22	Middle Sherman	F	1.87044	1.88662	0.01618	0.01619	1.87702	0.00960	0.00960	10	0.9600	-	9	1.0667	-
23	Middle Sherman	G	1.87600	1.89195	0.01595	0.01596	1.88213	0.00982	0.00982	10	0.9820	-	10	0.9820	-
24	Middle Sherman	H	1.98053	1.99177	0.01124	0.01125	1.98504	0.00673	0.00673	9	0.7478		5	1.3460	
Blank	B		1.99125	1.99124	-1E-05		1.99130	0.00006							

* note: Lowerslate A was processed with the blank on the previous spreadsheet page (no adjustment necessary for blank weight loss). It is included on this page for the purpose of mean calculation.

"Slate Creek" = "Middle Slate" on COC

11/29/10

11/30/10
QA: AR 11/29/10

Toxstat version 3.5
Coeur
Study #60147217-058-(056-058, 060)
Chironomus dilutus 10-day Sediment Test
List Data for Growth, per surviving organism (AFDW)

File: 058cgs.dat Transform: NO TRANSFORMATION
Number of Groups: 5

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE
1	Form Sediment	1	1.6780	1.6780
1	Form Sediment	2	1.3162	1.3162
1	Form Sediment	3	1.1538	1.1538
1	Form Sediment	4	1.0767	1.0767
1	Form Sediment	5	1.6840	1.6840
1	Form Sediment	6	1.0600	1.0600
1	Form Sediment	7	1.1729	1.1729
1	Form Sediment	8	1.2725	1.2725
2	Johnson Creek	1	1.3360	1.3360
2	Johnson Creek	2	1.7660	1.7660
2	Johnson Creek	3	1.4840	1.4840
2	Johnson Creek	4	1.2438	1.2438
2	Johnson Creek	5	1.2683	1.2683
2	Johnson Creek	6	1.2011	1.2011
2	Johnson Creek	7	1.7900	1.7900
2	Johnson Creek	8	1.3325	1.3325
3	Lower Slate	1	0.8887	0.8887
3	Lower Slate	2	0.9111	0.9111
3	Lower Slate	3	1.1371	1.1371
3	Lower Slate	4	0.8880	0.8880
3	Lower Slate	5	0.7533	0.7533
3	Lower Slate	6	0.9757	0.9757
3	Lower Slate	7	0.9613	0.9613
3	Lower Slate	8	0.8200	0.8200
4	Slate Creek	1	0.7225	0.7225
4	Slate Creek	2	0.9329	0.9329
4	Slate Creek	3	0.9311	0.9311
4	Slate Creek	4	0.7833	0.7833
4	Slate Creek	5	0.8200	0.8200
4	Slate Creek	6	0.6989	0.6989
4	Slate Creek	7	1.1567	1.1567
4	Slate Creek	8	0.9517	0.9517
5	Sherman	1	1.0767	1.0767
5	Sherman	2	0.7275	0.7275
5	Sherman	3	0.9600	0.9600
5	Sherman	4	2.0200	2.0200
5	Sherman	5	1.0350	1.0350
5	Sherman	6	1.0667	1.0667
5	Sherman	7	0.9820	0.9820
5	Sherman	8	1.3460	1.3460

"Slate Creek" = "Middle Slate" on COC

CAJ 11/29/10
QA: AR 11/29/10

Toxstat version 3.5
Coeur
Study #60147217-058-(056-058, 060)
Chironomus dilutus 10-day Sediment Test
Summary of Growth, per surviving organism (AFDW)

File: 058cgs.dat Transform: NO TRANSFORMATION

Summary Statistics on Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Form Sediment	8	1.0600	1.6840	1.3018
2	Johnson Creek	8	1.2011	1.7900	1.4277
3	Lower Slate	8	0.7533	1.1371	0.9169
4	Slate Creek	8	0.6989	1.1567	0.8746
5	Sherman	8	0.7275	2.0200	1.1517

Summary Statistics on Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Form Sediment	0.0623	0.2497	0.0883	19.1789
2	Johnson Creek	0.0538	0.2320	0.0820	16.2532
3	Lower Slate	0.0131	0.1145	0.0405	12.4853
4	Slate Creek	0.0225	0.1500	0.0530	17.1466
5	Sherman	0.1520	0.3898	0.1378	33.8453

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OK 11/29/10
QA: AR 11/29/10

Toxstat version 3.5
Coeur
Study #60147217-058-(056-058, 060)
Chironomus dilutus 10-day Sediment Test
Determination of Statistical Difference Compared to the Formulated Sediment Control for Growth, per surviving organism (AFDW)

File: 058cgs.dat Transform: NO TRANSFORMATION

Shapiro - Wilk's Test for Normality

D = 2.1261
W = 0.8823
Critical W = 0.9190 (alpha = 0.01 , N = 40)
W = 0.9400 (alpha = 0.05 , N = 40)

Data FAIL normality test (alpha = 0.01). Try another transformation.
Warning - The first three homogeneity tests are sensitive to non-normality and should not be performed with this data as is.

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 11.2908 (p-value = 0.0235)
Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

Critical B = 13.2767 (alpha = 0.01, df = 4)
= 9.4877 (alpha = 0.05, df = 4)

Steel's Many-One Rank Test - Ho: Control<Treatment

GROUP	IDENTIFICATION	MEAN IN ORIGINAL UNITS	RANK SUM	CRIT. VALUE	DF	SIG 0.05
1	Form Sediment	1.3018				
2	Johnson Creek	1.4277	82.00	47.00	8.00	
3	Lower Slate	0.9169	38.00	47.00	8.00	*
4	Slate Creek	0.8746	39.00	47.00	8.00	*
5	Sherman	1.1517	52.50	47.00	8.00	

Critical values are 1 tailed (k = 4)

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AB: AR 11/29/10

Toxstat version 3.5
Coeur
Study #60147217-058-(056-058, 060)
Chironomus dilutus 10-day Sediment Test
List Data for Growth, per original organism (AFDW)

File: 058cgo.dat Transform: NO TRANSFORMATION
Number of Groups: 5

GRP	IDENTIFICATION	REP	VALUE	TRANS VALUE	
1	Form Sediment	1	0.8390	0.8390	
1	Form Sediment	2	1.0530	1.0530	
1	Form Sediment	3	0.9230	0.9230	
1	Form Sediment	4	0.9690	0.9690	
1	Form Sediment	5	0.8420	0.8420	
1	Form Sediment	6	0.6360	0.6360	
1	Form Sediment	7	0.8210	0.8210	
1	Form Sediment	8	1.0180	1.0180	
2	Johnson Creek	1	1.0660	1.0660	replicate H
2	Johnson Creek	2	0.7160	0.7160	G
2	Johnson Creek	3	1.0810	1.0810	F
2	Johnson Creek	4	0.8456	0.8456	E
2	Johnson Creek	5	1.1056	1.1056	D
2	Johnson Creek	6	0.8244	0.8244	C
2	Johnson Creek	7	1.1038	1.1038	B
2	Johnson Creek	8	1.3360	1.3360	A
3	Lower Slate	1	0.7110	0.7110	
3	Lower Slate	2	0.8200	0.8200	
3	Lower Slate	3	0.7960	0.7960	
3	Lower Slate	4	0.8880	0.8880	
3	Lower Slate	5	0.6780	0.6780	
3	Lower Slate	6	0.6830	0.6830	
3	Lower Slate	7	0.7690	0.7690	
3	Lower Slate	8	0.6560	0.6560	
4	Slate Creek	1	0.5780	0.5780	
4	Slate Creek	2	0.6530	0.6530	
4	Slate Creek	3	0.8380	0.8380	
4	Slate Creek	4	0.7050	0.7050	
4	Slate Creek	5	0.8200	0.8200	
4	Slate Creek	6	0.6290	0.6290	
4	Slate Creek	7	0.6940	0.6940	
4	Slate Creek	8	0.5710	0.5710	
5	Sherman	1	0.9690	0.9690	
5	Sherman	2	0.7275	0.7275	
5	Sherman	3	0.8533	0.8533	
5	Sherman	4	0.4489	0.4489	
5	Sherman	5	0.5175	0.5175	
5	Sherman	6	0.9600	0.9600	
5	Sherman	7	0.9820	0.9820	
5	Sherman	8	0.7478	0.7478	

"Slate Creek = "Middle Slate" on COC

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8/11/29/10
QA: AR 11/29/10

Toxstat version 3.5
Coeur
Study #60147217-058-(056-058, 060)
Chironomus dilutus 10-day Sediment Test
Summary of Growth, per original organism (AFDW)

File: 058cgo.dat Transform: NO TRANSFORMATION

Summary Statistics on Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Form Sediment	8	0.6360	1.0530	0.8876
2	Johnson Creek	8	0.7160	1.3360	1.0098
3	Lower Slate	8	0.6560	0.8880	0.7501
4	Slate Creek	8	0.5710	0.8380	0.6860
5	Sherman	8	0.4489	0.9820	0.7758

Summary Statistics on Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Form Sediment	0.0178	0.1333	0.0471	15.0199
2	Johnson Creek	0.0400	0.2001	0.0707	19.8166
3	Lower Slate	0.0066	0.0815	0.0288	10.8596
4	Slate Creek	0.0101	0.1005	0.0355	14.6512
5	Sherman	0.0424	0.2058	0.0728	26.5294

Toxstat version 3.5
Coeur
Study #60147217-058-(056-058, 060)
Chironomus dilutus 10-day Sediment Test
Determination of Statistical Difference Compared to the Formulated Sediment Control for Growth, per original organism (AFDW)

File: 058cgo.dat Transform: NO TRANSFORMATION

Shapiro - Wilk's Test for Normality

D = 0.8184
W = 0.9783

Critical W = 0.9190 (alpha = 0.01 , N = 40)
W = 0.9400 (alpha = 0.05 , N = 40)

Data PASS normality test (alpha = 0.01). Continue analysis.

Bartlett's Test for Homogeneity of Variance

Calculated B1 statistic = 8.2163 (p-value = 0.0840)

Data PASS B1 homogeneity test at 0.01 level. Continue analysis.

Critical B = 13.2767 (alpha = 0.01, df = 4)
= 9.4877 (alpha = 0.05, df = 4)

Pag 20 of 22
11/29/10
QA: ARW 11/29/10

Toxstat version 3.5
Coeur
Study #60147217-058-(056-058, 060)
Chironomus dilutus 10-day Sediment Test
Determination of Statistical Difference Compared to the Formulated Sediment Control for Growth, per original organism (AFDW)

File: 058cgo.dat Transform: NO TRANSFORMATION

ANOVA Table

SOURCE	DF	SS	MS	F
Between	4	0.5230	0.1308	5.5921
Within (Error)	35	0.8184	0.0234	
Total	39	1.3414		

(p-value = 0.0014)

Critical F = 3.9082 (alpha = 0.01, df = 4,35)
= 2.6415 (alpha = 0.05, df = 4,35)
Since F > Critical F REJECT Ho: All equal (alpha = 0.05)

Dunnett's Test - TABLE 1 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	TRANSFORMED MEAN	MEAN CALCULATED IN ORIGINAL UNITS	T STAT	SIG 0.05
1	Form Sediment	0.8876	0.8876		
2	Johnson Creek	1.0098	1.0098	-1.5980	
3	Lower Slate	0.7501	0.7501	1.7984	
4	Slate Creek	0.6860	0.6860	2.6372	*
5	Sherman	0.7758	0.7758	1.4633	

Dunnett critical value = 2.2500 (1 Tailed, alpha = 0.05, df [used] = 4,30)
(Actual df = 4,35)

Dunnett's Test - TABLE 2 OF 2 Ho:Control<Treatment

GROUP	IDENTIFICATION	NUM OF REPS	MIN SIG DIFF (IN ORIG. UNITS)	% OF CONTROL	DIFFERENCE FROM CONTROL
1	Form Sediment	8			
2	Johnson Creek	8	0.1720	19.4	-0.1222
3	Lower Slate	8	0.1720	19.4	0.1375
4	Slate Creek	8	0.1720	19.4	0.2016
5	Sherman	8	0.1720	19.4	0.1119

FCETL QA Form No.131
Revision 0
Effective 10/06

PERCENT TOTAL SOLIDS AND PERCENT TOTAL VOLATILE SOLIDS (TVS)

DAP 11/29/10
QA: AR 11/29/10

Project No: 60147219-058 (056, 058, 060) ①

Analytical Balance ID: A+D #1

TARE: Date/time: 10/5/10 @ 1515 Analyst: DAP

DRY GROSS: Date/time: 10/7/10 @ 1030 Analyst: DAP

ASHED GROSS: Date/time: 10/15/10 @ 1809 Analyst: DAP

Dried in Oven # 1 from Date: 10/5/10 Time: 1800
Oven °C: 104 to Date: 10/6/10 Time: 1800

Ashed in Furnace from Date: 10/8/10 Time: 1210
Furnace °C: 500 to Date: 10/8/10 Time: 1620

Dish No.	Treatment	Rep	Tare Weight of Dish (g) A	Dish + Wet Sample (g) B	Dry Gross Weight (g) (dish + dry sample) C	% Total Solids (g) [(C-A)(100)]/(B-A)	Ashed Gross Weight (dish + sample)(g) D	% Total Volatile Solids (g) [(C-D)(100)]/(C-A)
15	Johnson Cr.	A	18.3876	41.9384	29.4457		28.027 ② 80	
10	"	B	18.0146	38.1657	27.4551		26.2057	
26	Lower Slate	A	19.0543	34.8938	21.7236		20.9226	
7	"	B	19.9945	38.8426	23.1426		22.1907	
28	Slate	A	18.1438	35.0827	20.8573		20.1236	
21	Slate	B	19.9271	33.2610	22.0819		21.4875	
19	③ ~~middle~~ Sherman	A	18.0640	40.7629	34.2889		33.6929	
16	"	B	19.1703	45.3521	35.3308		34.6747	
Blank	(1)		20.2119		20.2118		20.2119	

[1] Add in weight loss of blank boat, if appropriate.

① DAP 10/5/10 E ② DAP 10/15/10 E ③ DAP 11/29/10 E ④ AR 11/29/10 E

Note: "Slate" ~~Gree~~ ④ = "Middle Slate" on COC (AR)

FCETL QA Form No. 132
Revision 0
Effective 10/09

Percent Total Solids and Percent Total Volatile Solids

11/29/10
QA: AR 11/29/10

Project Number: 60147217-058-(056-058, 060)

Treatment	Rep		Tare Weight (g) A	Dish + Wet Sample (g) B	Dry Gross Weight (g) (dish + dry sample) C	% Total Solids [(C-A)(100)]/(B-A)	Treatment Mean % Total Solids	Ashed Gross Weight (g) (dish + sample) D	% Total Volatile Solids [(C-D)(100)]/(C-A)	Treatment Mean % Total Volatile Solids
Johnson Creek	A		18.3876	41.9384	29.4457	46.9542	46.9014	28.0280	12.8205	13.0275
	B		18.0146	38.1657	27.4551	46.8486		26.2057	13.2345	
Lower Slate Cr.	A		19.0543	34.8938	21.7236	16.8522	16.7773	20.9226	30.0079	30.1226
	B		19.9945	38.8426	23.1426	16.7025		22.1907	30.2373	
Middle Slate Cr.	A		18.1438	35.0827	20.8573	16.0193	16.0898	20.1236	27.0389	27.3119
	B		19.9271	33.2610	22.0819	16.1603		21.4875	27.5849	
Sherman Cr.	A		18.0640	40.7629	34.2889	71.4788	66.6015	33.6929	3.6734	3.8666
	B		19.1703	45.3521	35.3308	61.7242		34.6747	4.0599	
Blank			20.2119		20.2118			20.2119		

APPENDIX C

Analytical Data

Thursday, November 04, 2010

Analytical Laboratory

Dave Pillard
AECOM
4303 W Laporte Ave
Fort Collins, CO 80521

RE: PROJECT NO. 60147217-058 Work Order: 1010004

Dear Dave Pillard:

MSE Lab Services received 8 sample(s) on 9/30/2010 for the analyses presented in the following report.

Please find enclosed analytical results for the sample(s) received at the MSE Laboratory.

If you have any questions regarding these test results, please feel free to call.

Sincerely,

Sara Ward

Sara Ward
Laboratory Manager
406-494-7334

Enclosure

MSE Analytical Laboratory
P.O. Box 4078
200 Technology Way
Butte, MT 59701
Lab: 406-494-7334
Fax: 406-494-7230
labinfo@mse-ta.com

E-MAILED
11/8/10 SW

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-001

Client Sample ID: 23991-JOHNSON CREEK
Collection Date: 9/16/2010 4:00:00 PM
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
SW-846-ICP-AES TOTAL METALS			**SW6010B**	**SW3050B**			Analyst: **MC**
Aluminum	17400	6.40	24.3		mg/Kg-dry	1	10/21/2010
Chromium	35.9	8.75	20.3		mg/Kg-dry	1	10/21/2010
Zinc	126	5.67	20.3		mg/Kg-dry	1	10/21/2010
ICP-MS METALS, SOLID SAMPLES			**SW6020**	**SW3050B**			Analyst: **kgw**
Arsenic	25.0	0.176	0.608		mg/Kg-dry	2	10/26/2010
Cadmium	0.454	0.011	0.041		mg/Kg-dry	2	10/26/2010
Copper	155	0.186	0.506		mg/Kg-dry	2	10/26/2010
Lead	16.4	0.018	0.081		mg/Kg-dry	2	10/26/2010
Nickel	32.7	0.116	0.405		mg/Kg-dry	2	10/26/2010
Selenium	0.296	0.275	0.810	J	mg/Kg-dry	2	10/26/2010
Silver	0.746	0.149	0.405		mg/Kg-dry	2	10/26/2010
MERCURY IN SOIL/SEDIMENT - SW846 7471B			**E245.5**	**SW7471A**			Analyst: **kgw**
Mercury	0.156	0.0608	0.209	J	mg/Kg-dry	1	10/28/2010
ORGANIC MATTER-WALKLEY BLACK		**OM_WALKLEYBLACK**					Analyst: **YF**
Organic Matter - Walkley Black	7.86	0.09	0.20		%	1	10/21/2010
PERCENT COARSE MATERIAL			**ASTMD422**				Analyst: **dk**
1" Gradation	ND	0.05	0.10		%	1	10/15/2010
2mm Gradation	4.05	0.05	0.10		%	1	10/15/2010
RAPID HYDROMETER (2 HOUR) MOD ASA 15-5			**MSA15-5**				Analyst: **dk**
% Clay	18.0	0.1	0.1		%	1	10/18/2010
% Sand	50.0	0.1	0.1		%	1	10/18/2010
% Silt	32.0	0.1	0.1		%	1	10/18/2010
Soil Class	LOAM					1	10/18/2010
PERCENT MOISTURE			**D2216**				Analyst: **dk**
Percent Moisture	50.6	0.01	0.05		wt%	1	10/20/2010

KW **Review**

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-002

Client Sample ID: 23992-JOHNSON CREEK
Collection Date: 8/8/2010
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
ACID VOLATILE SULFIDE-SIM. EXT. METALS			**AVS-SEM**				Analyst: **kgw**
Sulfide	2.08	0.55	1.50		µmoles/g	1	10/11/2010

KW **Review**

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-003

Client Sample ID: 23993-MIDDLE SHERMAN
Collection Date: 9/16/2010 4:00:00 PM
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
SW-846-ICP-AES TOTAL METALS			**SW6010B**	**SW3050B**			Analyst: **MC**
Aluminum	18100	4.14	15.7		mg/Kg-dry	1	10/21/2010
Chromium	37.4	5.66	13.1		mg/Kg-dry	1	10/21/2010
Zinc	126	3.67	13.1		mg/Kg-dry	1	10/21/2010
ICP-MS METALS, SOLID SAMPLES			**SW6020**	**SW3050B**			Analyst: **kgw**
Arsenic	74.3	0.114	0.393		mg/Kg-dry	2	10/26/2010
Cadmium	0.424	0.007	0.026		mg/Kg-dry	2	10/26/2010
Copper	103	0.108	0.328		mg/Kg-dry	2	10/26/2010
Lead	18.7	0.012	0.052		mg/Kg-dry	2	10/26/2010
Nickel	38.7	0.075	0.262		mg/Kg-dry	2	10/26/2010
Selenium	0.585	0.178	0.524		mg/Kg-dry	2	10/26/2010
Silver	0.328	0.097	0.262		mg/Kg-dry	2	10/26/2010
MERCURY IN SOIL/SEDIMENT - SW846 7471B			**E245.5**	**SW7471A**			Analyst: **kgw**
Mercury	0.0757	0.0419	0.144	J	mg/Kg-dry	1	10/28/2010
ORGANIC MATTER-WALKLEY BLACK		**OM_WALKLEYBLACK**					Analyst: **YF**
Organic Matter - Walkley Black	3.10	0.09	0.20		%	1	10/21/2010
PERCENT COARSE MATERIAL			**ASTMD422**				Analyst: **dk**
1" Gradation	ND	0.05	0.10		%	1	10/15/2010
2mm Gradation	7.16	0.05	0.10		%	1	10/15/2010
RAPID HYDROMETER (2 HOUR) MOD ASA 15-5			**MSA15-5**				Analyst: **dk**
% Clay	7.0	0.1	0.1		%	1	10/18/2010
% Sand	78.0	0.1	0.1		%	1	10/18/2010
% Silt	15.0	0.1	0.1		%	1	10/18/2010
Soil Class	LOAMY SAND					1	10/18/2010
PERCENT MOISTURE			**D2216**				Analyst: **dk**
Percent Moisture	23.7	0.01	0.05		wt%	1	10/20/2010

Review

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-004

Client Sample ID: 23994-SHERMAN
Collection Date: 8/16/2010
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
ACID VOLATILE SULFIDE-SIM. EXT. METALS			**AVS-SEM**				Analyst: **kgw**
Sulfide	1.93	0.55	1.50		µmoles/g	1	10/11/2010

KW **Review**

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-005

Client Sample ID: 23995-SLATE
Collection Date: 9/16/2010 4:00:00 PM
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
SW-846-ICP-AES TOTAL METALS			**SW6010B**	**SW3050B**			Analyst: **MC**
Aluminum	22300	14.5	55.0		mg/Kg-dry	1	10/21/2010
Chromium	45.0	19.8	45.8	J	mg/Kg-dry	1	10/21/2010
Zinc	2140	12.8	45.8		mg/Kg-dry	1	10/21/2010
ICP-MS METALS, SOLID SAMPLES			**SW6020**	**SW3050B**			Analyst: **kgw**
Arsenic	48.8	0.399	1.38		mg/Kg-dry	2	10/26/2010
Cadmium	32.0	0.024	0.092		mg/Kg-dry	2	10/26/2010
Copper	203	0.376	1.15		mg/Kg-dry	2	10/26/2010
Lead	16.6	0.041	0.183		mg/Kg-dry	2	10/26/2010
Nickel	168	0.263	0.917		mg/Kg-dry	2	10/26/2010
Selenium	8.70	0.623	1.83		mg/Kg-dry	2	10/26/2010
Silver	0.534	0.338	0.917	J	mg/Kg-dry	2	10/26/2010
MERCURY IN SOIL/SEDIMENT - SW846 7471B			**E245.5**	**SW7471A**			Analyst: **kgw**
Mercury	0.179	0.135	0.465	J	mg/Kg-dry	1	10/28/2010
ORGANIC MATTER-WALKLEY BLACK			**OM_WALKLEYBLACK**				Analyst: **YF**
Organic Matter - Walkley Black	18.9	0.09	0.20		%	1	10/21/2010
PERCENT COARSE MATERIAL			**ASTMD422**				Analyst: **dk**
1" Gradation	ND	0.05	0.10		%	1	10/15/2010
2mm Gradation	3.03	0.05	0.10		%	1	10/15/2010
RAPID HYDROMETER (2 HOUR) MOD ASA 15-5			**MSA15-5**				Analyst: **dk**
% Clay	28.0	0.1	0.1		%	1	10/18/2010
% Sand	28.0	0.1	0.1		%	1	10/18/2010
% Silt	44.0	0.1	0.1		%	1	10/18/2010
Soil Class	CLAY LOAM					1	10/18/2010
PERCENT MOISTURE			**D2216**				Analyst: **dk**
Percent Moisture	78.2	0.01	0.05		wt%	1	10/20/2010

KW **Review**

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-006

Client Sample ID: 23996-MIDDLE SLATE
Collection Date:
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
ACID VOLATILE SULFIDE-SIM. EXT. METALS			**AVS-SEM**				Analyst: **kgw**
Sulfide	5.79	0.55	1.50		µmoles/g	1	10/11/2010

Review

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-007

Client Sample ID: 23997-LOWER SLATE
Collection Date: 9/16/2010 4:00:00 PM
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
SW-846-ICP-AES TOTAL METALS			**SW6010B**	**SW3050B**			Analyst: **MC**
Aluminum	17800	15.0	57.1		mg/Kg-dry	1	10/21/2010
Chromium	37.5	20.6	47.6	J	mg/Kg-dry	1	10/21/2010
Zinc	1920	13.3	47.6		mg/Kg-dry	1	10/21/2010
ICP-MS METALS, SOLID SAMPLES			**SW6020**	**SW3050B**			Analyst: **kgw**
Arsenic	38.5	0.414	1.43		mg/Kg-dry	2	10/26/2010
Cadmium	34.8	0.025	0.095		mg/Kg-dry	2	10/26/2010
Copper	174	0.391	1.19		mg/Kg-dry	2	10/26/2010
Lead	13.6	0.043	0.190		mg/Kg-dry	2	10/26/2010
Nickel	152	0.273	0.952		mg/Kg-dry	2	10/26/2010
Selenium	6.00	0.647	1.90		mg/Kg-dry	2	10/26/2010
Silver	0.416	0.351	0.952	J	mg/Kg-dry	2	10/26/2010
MERCURY IN SOIL/SEDIMENT - SW846 7471B			**E245.5**	**SW7471A**			Analyst: **kgw**
Mercury	0.188	0.141	0.486	J	mg/Kg-dry	1	10/28/2010
ORGANIC MATTER-WALKLEY BLACK			**OM_WALKLEYBLACK**				Analyst: **YF**
Organic Matter - Walkley Black	17.6	0.09	0.20		%	1	10/21/2010
PERCENT COARSE MATERIAL			**ASTMD422**				Analyst: **dk**
1" Gradation	ND	0.05	0.10		%	1	10/15/2010
2mm Gradation	5.58	0.05	0.10		%	1	10/15/2010
RAPID HYDROMETER (2 HOUR) MOD ASA 15-5			**MSA15-5**				Analyst: **dk**
% Clay	32.0	0.1	0.1		%	1	10/18/2010
% Sand	34.0	0.1	0.1		%	1	10/18/2010
% Silt	34.0	0.1	0.1		%	1	10/18/2010
Soil Class	CLAY LOAM					1	10/18/2010
PERCENT MOISTURE			**D2216**				Analyst: **dk**
Percent Moisture	79.0	0.01	0.05		wt%	1	10/20/2010

KW **Review**

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-008

Client Sample ID: 23998-LOWER SLATE
Collection Date: 8/16/2010
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
ACID VOLATILE SULFIDE-SIM. EXT. METALS			**AVS-SEM**				Analyst: **kgw**
Sulfide	9.90	0.55	1.50		µmoles/g	1	10/11/2010

Review

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

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Date: 04-Nov-10
Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058
Work Order: 1010004
BatchID: 3871

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: 3871-PB-FILTERED			*Method: SW6010B*		*Batch ID: 3871*			*Analysis Date: 10/21/2010*		
Aluminum	ND	12.0	mg/Kg							
Chromium	ND	10.0	mg/Kg							
Zinc	ND	10.0	mg/Kg							
Sample ID: 3871-PB-UNFILTERED			*Method: SW6010B*		*Batch ID: 3871*			*Analysis Date: 10/21/2010*		
Aluminum	ND	12.0	mg/Kg							
Chromium	ND	10.0	mg/Kg							
Zinc	ND	10.0	mg/Kg							
Sample ID: 3871-LCS			*Method: SW6010B*		*Batch ID: 3871*			*Analysis Date: 10/21/2010*		
Aluminum	10400	12.0	mg/Kg	10270	101	80	120			
Chromium	148	10.0	mg/Kg	139.0	107	80	120			
Zinc	338	10.0	mg/Kg	334.0	101	80	120			
Sample ID: 1010004-001A-MS			*Method: SW6010B*		*Batch ID: 3871*			*Analysis Date: 10/21/2010*		
Aluminum	31500	24.3	mg/Kg-dry	20800	67.8	75	125			S*
Chromium	315	20.3	mg/Kg-dry	281.6	99.1	75	125			
Zinc	786	20.3	mg/Kg-dry	676.5	97.6	75	125			
Sample ID: 1010004-001A-MSD			*Method: SW6010B*		*Batch ID: 3871*			*Analysis Date: 10/21/2010*		
Aluminum	31900	24.3	mg/Kg-dry	20800	69.8	75	125	1.36	20	S*
Chromium	318	20.3	mg/Kg-dry	281.6	100	75	125	1.08	20	
Zinc	803	20.3	mg/Kg-dry	676.5	100	75	125	2.06	20	
Sample ID: 1010004-001A-MST			*Method: SW6010B*		*Batch ID: 3871*			*Analysis Date: 10/21/2010*		
Aluminum	34200	24.3	mg/Kg-dry	20800	80.8	75	125	8.23	20	
Chromium	330	20.3	mg/Kg-dry	281.6	105	75	125	4.74	20	
Zinc	784	20.3	mg/Kg-dry	676.5	97.3	75	125	0.282	20	
Sample ID: 3871-PB-FILTERED			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Arsenic	ND	0.150	mg/Kg							
Cadmium	ND	0.010	mg/Kg							
Copper	ND	0.125	mg/Kg							
Lead	0.008	0.020	mg/Kg							J
Nickel	ND	0.100	mg/Kg							
Selenium	ND	0.200	mg/Kg							
Silver	ND	0.100	mg/Kg							
Sample ID: 3871-PB-UNFILTERED			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Arsenic	ND	0.150	mg/Kg							
Cadmium	ND	0.010	mg/Kg							
Copper	0.072	0.125	mg/Kg							J
Lead	ND	0.020	mg/Kg							
Nickel	0.091	0.100	mg/Kg							J

KW Review

Qualifiers: NA Sample conc. is > 4*spike level

S* Spike Recovery outside limits; within Manufacturer Limits
Manufacturer Limits for Aluminum 4290-15100 mg/kg

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Date: 04-Nov-10
Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058

Work Order: 1010004
BatchID: 3871

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: 3871-PB-UNFILTERED			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Selenium	ND	0.200	mg/Kg							
Silver	ND	0.100	mg/Kg							
Sample ID: 3871-LCS			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Arsenic	281	0.300	mg/Kg	269.0	104	80	120			
Cadmium	306	0.020	mg/Kg	285.0	107	80	120			
Copper	127	0.250	mg/Kg	111.0	115	80	120			
Lead	204	0.040	mg/Kg	190.0	107	80	120			
Nickel	355	0.200	mg/Kg	314.0	113	80	120			
Selenium	142	0.400	mg/Kg	144.0	98.4	80	120			
Silver	70.5	0.200	mg/Kg	62.20	113	80	120			
Sample ID: 1010004-001A-MS			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Arsenic	578	0.608	mg/Kg-dry	544.9	101	75	125			
Cadmium	604	0.041	mg/Kg-dry	577.3	105	75	125			
Copper	396	0.506	mg/Kg-dry	224.8	107	75	125			
Lead	410	0.081	mg/Kg-dry	384.9	102	75	125			
Nickel	716	0.405	mg/Kg-dry	636.0	107	75	125			
Selenium	289	0.810	mg/Kg-dry	291.7	98.8	75	125			
Silver	138	0.405	mg/Kg-dry	126.0	109	75	125			
Sample ID: 1010004-001A-MSD			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Arsenic	600	0.608	mg/Kg-dry	544.9	106	75	125	3.82	20	
Cadmium	619	0.041	mg/Kg-dry	577.3	107	75	125	2.46	20	
Copper	397	0.506	mg/Kg-dry	224.8	108	75	125	0.453	20	
Lead	433	0.081	mg/Kg-dry	384.9	108	75	125	5.30	20	
Nickel	738	0.405	mg/Kg-dry	636.0	111	75	125	3.11	20	
Selenium	297	0.810	mg/Kg-dry	291.7	102	75	125	2.74	20	
Silver	143	0.405	mg/Kg-dry	126.0	113	75	125	3.45	20	
Sample ID: 1010004-001A-MST			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Arsenic	580	0.608	mg/Kg-dry	544.9	102	75	125	0.358	20	
Cadmium	607	0.041	mg/Kg-dry	577.3	105	75	125	0.445	20	
Copper	400	0.506	mg/Kg-dry	224.8	109	75	125	1.17	20	
Lead	415	0.081	mg/Kg-dry	384.9	104	75	125	1.10	20	
Nickel	731	0.405	mg/Kg-dry	636.0	110	75	125	2.06	20	
Selenium	285	0.810	mg/Kg-dry	291.7	97.7	75	125	1.13	20	
Silver	139	0.405	mg/Kg-dry	126.0	110	75	125	1.30	20	

KWS Review

Qualifiers: NA Sample conc. is > 4*spike level S* Spike Recovery outside limits; within Manufacturer Limits

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Date: 04-Nov-10
Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058

Work Order: 1010004
BatchID: 3921

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: ***3921-PB***			*Method:* ***E245.5***		*Batch ID:* ***3921***			*Analysis Date:*	***10/28/2010***	
Mercury	ND	0.100	mg/Kg							
Sample ID: ***1010004-001A-MS***			*Method:* ***E245.5***		*Batch ID:* ***3921***			*Analysis Date:*	***10/28/2010***	
Mercury	57.4	4.65	mg/Kg-dry	49.22	116	51.5	148.6			
Sample ID: ***1010004-001A-MSD***			*Method:* ***E245.5***		*Batch ID:* ***3921***			*Analysis Date:*	***10/28/2010***	
Mercury	53.6	4.67	mg/Kg-dry	49.22	109	51.5	148.6	6.92	20	
Sample ID: ***LCS-3921***			*Method:* ***E245.5***		*Batch ID:* ***3921***			*Analysis Date:*	***10/28/2010***	
Mercury	30.3	2.50	mg/Kg	24.20	125	51.5	148.6			

Review

Qualifiers: NA Sample conc. is > 4*spike level
S* Spike Recovery outside limits; within Manufacturer Limits

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Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058

Work Order: 1010004
BatchID: R14348

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: ***1010004-001A-D***			*Method:* ***MSA15-5***		*Batch ID:* ***R14348***			*Analysis Date:*	***10/18/2010***	
% Clay	16.0	0.1	%					11.8	35	
% Sand	50.0	0.1	%					0	35	
% Silt	34.0	0.1	%					6.06	35	
Soil Class	LOAM		%							

KW Review

Qualifiers: NA Sample conc. is > 4*spike level S* Spike Recovery outside limits; within Manufacturer Limits

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Date: 04-Nov-10
Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058
Work Order: 1010004
BatchID: R14390

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: ***1010004-001AD***			*Method:* ***OM_WALKLE***		*Batch ID:* ***R14390***			*Analysis Date:*	***10/21/2010***	
Organic Matter - Walkl	7.85	0.20	%					0.0497	35	
Sample ID: ***LCS***			*Method:* ***OM_WALKLE***		*Batch ID:* ***R14390***			*Analysis Date:*	***10/21/2010***	
Organic Matter - Walkl	0.62	0.20	%	0.5985	104	70.7	109			
Sample ID: ***A-BLANK***			*Method:* ***OM_WALKLE***		*Batch ID:* ***R14390***			*Analysis Date:*	***10/21/2010***	
Organic Matter - Walkl	ND	0.20	%							

KW Review

Qualifiers: NA Sample conc. is > 4*spike level
S* Spike Recovery outside limits; within Manufacturer Limits

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Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058

Work Order: 1010004
BatchID: R14452

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: ***1010004-001A-D***			*Method:* ***D2216***		*Batch ID:* ***R14452***			*Analysis Date:*	***10/20/2010***	
Percent Moisture	51.0	0.05	wt%					0.702	35	

Review

Qualifiers: NA Sample conc. is > 4*spike level

S* Spike Recovery outside limits; within Manufacturer Limits

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Butte, MT 59701
Lab: 406-494-7334
Fax: 406-494-7230
labinfo@mse-te.com

Date: 04-Nov-10
Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058

Work Order: 1010004
BatchID: R14514

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: ***1010004-002A-D***			*Method:* ***AVS-SEM***		*Batch ID:* ***R14514***			*Analysis Date:*	***10/11/2010***	
Sulfide	2.30	1.50	µmoles/g					9.82	35	
Sample ID: ***1010004-002A-S***			*Method:* ***AVS-SEM***		*Batch ID:* ***R14514***			*Analysis Date:*	***10/11/2010***	
Sulfide	16.6	1.50	µmoles/g	17.80	81.4	80	120			
Sample ID: ***LCS WC2343***			*Method:* ***AVS-SEM***		*Batch ID:* ***R14514***			*Analysis Date:*	***10/11/2010***	
Sulfide	12.1	1.50	µmoles/g	12.58	96.2	85	105			
Sample ID: ***PB***			*Method:* ***AVS-SEM***		*Batch ID:* ***R14514***			*Analysis Date:*	***10/11/2010***	
Sulfide	ND	1.50	µmoles/g							

KLD **Review**

Qualifiers: NA Sample conc. is > 4*spike level S* Spike Recovery outside limits; within Manufacturer Limits

AECOM

CHAIN OF CUSTODY RECORD

1010004-

Page ____ of ____

Client/Project Name:

Project Location:

Project Number: 60147217-058

Field Logbook No.:

Sampler (Print Name)/(Affiliation): Liz Elory / D. Pillard / E. Sadler / C. Needham

Chain of Custody Tape Nos.: 42165

Signature:

Send Results/Report to: dave.pillard@aecom.com

TAT: standard

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	TOC (walkley Black)	Al, Cr, Ni, Ag, Zn	As, Cd, Cu, Pb, Se	Mercury	% Coarse material	Rapid hydro. (% clay, silt, sand)	AVS				Lab I.D.	Remarks
23991-johnson creek	9/16/10	1600		X	5 P	S	~~none~~ 7	NA	X	X	X	X	X	X					001	
23992-johnson creek	8/16/10	NA			2-8oz G										X				002	
23993-middle sherman	9/16/10	1600			P				X	X	X	X	X	X					003	
23994-sherman	8/16/10	NA			2-8oz G										X				004	
23995-slate	9/16/10	1600			P				X	X	X	X	X	X					005	
23996-middle slate	unk	NA			1-8oz G										X				006	
23997-lower slate	9/16/10	1600			P				X	X	X	X	X	X					007	
23998-lower slate	8/16/10	NA			1-8oz G										X				008	

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date	Analytical Laboratory (Destination):
Kelly Jaye AECOM Signature:	9/29/10 Time: 1400	Signature:	9/30/10 Time: 1100	MSE Lab P.O. box 4078 Butte, MT 59702 ~~AECOM Toxicology Lab~~ ① 4303 W. Laporte Avenue Fort Collins, CO 80521 (970) 416-0916 (970) 490-2963 (FAX)
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:	
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:	Sample Shipped Via: UPS FedEx Courier Other Temp blank: Yes No

① 9/29/10

8.8°C

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_Ft. Collins_10_07.doc

Serial No. 050855

MSE Lab Services

Sample Receipt Checklist

Client Name AECOM_INC

Date and Time Received: 9/30/2010 11:00:00 AM

Work Order Number 1010004 RcptNo: 1

Received by BO

COC_ID: CoolerID:

Checklist completed by R. O'Donnell 10/1/10 (Signature / Date)

Reviewed by MC 10/1/10 (Initials / Date)

Matrix: Carrier name FedEx

Shipping container/cooler in good condition?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☑	No ☐	Not Present ☐
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☐	No ☑	
Water - VOA vials have zero headspace?	No VOA vials submitted ☑	Yes ☐	No ☐
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Blank ☐

Adjusted? No-SED Checked by BO 10/1/10

Any No and/or NA (not applicable) response must be detailed in the comments section be

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: TEMP = NA SEDIMENT

Corrective Action _____

APPENDIX 1B: TOXICITY LAB REPORT FOR *Hyalella azteca*

Coeur Alaska, Inc.
Juneau, Alaska

Report of Short-Term Toxicity of Whole Sediment to *Hyalella azteca*

Prepared by

AECOM Environment
Environmental Toxicology
Fort Collins, CO

60147217-058-(050-055)
September 2010

Report of Short-Term Toxicity of Whole Sediment to Hyalella azteca

Project IDs: 60147217-058-(050-055)
September 2010

Sponsor and Laboratory Information

Sponsor	Coeur Alaska Inc. Kensington Mine 3031 Clinton Drive Suite 202 Juneau, Alaska 99801
Project Officer	Liz Flory (907) 364-2857
Testing Facility	AECOM Environment Fort Collins Environmental Toxicology Laboratory 4303 West LaPorte Ave. Fort Collins, CO 80521 Fax: (970) 490-2963 State of Florida NELAP Laboratory ID: E87972
Study Director	David A. Pillard (970) 416-0916, ext. 310 dave.pillard@aecom.com

Test Information

Test	Short-term chronic screening toxicity test of sediment	
Basis	USEPA (2000) and ASTM (2006)	
Test Protocol	HA3AK.TIE058.007	
Test Period	September 17, 2010 @ 1415 to September 27, 2010 @ 1630	
Test Length	10 days	
Species	*Hyalella azteca*	
Test Material	Whole sediment	
Sediment ID	Sample ID	AECOM Laboratory ID
	Johnson Creek	23991
	Lower Slate Creek	23997
	Middle Slate Creek	23995
	Sherman Creek	23993
Control Sediments	Silica Sand and Laboratory Formulated Sediment	
Overlying water	Moderately hard reconst. water prepared according to USEPA (2002), augmented with approximately 50 mg/L Cl^- (as NaCl)	
Test Concentrations	0 (control) and 100% of each test sediment	

- *Results described in this report apply only to the samples submitted to the laboratory and analyzed, as listed in the report*
- *Test results comply with NELAC standards. Reports are intended to be considered in their entirety; AECOM is not responsible for consequences arising from use of a partial report*
- *This report contains 7 pages plus 3 appendices*

Sediment Collection and Receipt

Sample ID	Collection Date and Time	AECOM No.	Date of Receipt	Temp. at Arrival (°C)[a]
Johnson Creek	08/18/10 @ 1415	23991	08/26/10	11.0
Lower Slate Creek	08/11/10 @ 1700	23997	08/26/10	11.0
Middle Slate Creek	08/11/10 @ 1130	23995	08/26/10	11.0
Sherman Creek	08/16/10 @ 1530	23993	08/26/10	11.0

[a] Air temperature of cooler
Note: See Appendix A for copies of chain of custody records

Control Sediment

The primary control sediment was silica sand, obtained from a local commercial supplier. A second control sediment, with a smaller grain size and higher organic matter content, was prepared in the laboratory. The composition of the formulated sediment is given in the following table (Kemble et al. 1999).

Composition of Laboratory Formulated Sediment (Control)

Material	Source	Pre-Treatment	Weight (g)
Quartz Sand	Unimin Corporation, Emmett, ID	Rinsed with gentle mixing in deionized water until water ran clear. Dried in oven.	1242
Silt/Clay (ASP400)	Mozel, St. Louis, MO. Distributor = Englehardt	None	219
Dolomite	Grey Rock Clay Center, Ft. Collins, CO.	None	7.5
α-cellulose	Sigma	None	77.3
Humic Acid	Fluka	None	0.15
Total			1545.95

Test Sediment Preparation

Sample ID	Date Homogenized	Time Homogenized
Johnson Creek	September 16, 2010	1203-1210
Lower Slate Creek		1210-1215
Middle Slate Creek		1225-1233
Sherman Creek		1217-1227

Before, during and after homogenization, debris (including sticks and other plant material) and large stones were removed from the sediment and discarded. Sherman Creek sediment was also passed through sieves (U.S. Standard 11.1 and 2 mm) to remove debris.

Test Conditions

Test Type	Static sediment with continuous replacement of overlying water
Test Duration	10 days
Overlying Water Delivery System	Continuous renewal (flow-through) [a]
Test Endpoints	Survival, dry weight per original and surviving organism
Test Chambers	500 ml plastic beakers
Test Sediment Volume	100 ml
Overlying Water Volume	175 ml
Replicates per Treatment	8
Organisms per Replicate	10
Test Temperature	23 ± 1°C
Lighting	Fluorescent, 16 hours light:8 hours dark
Chamber Placement	Randomized
Test Sediment Renewal	None
Test Overlying Water Renewal	Approximately two volume additions per test chamber per day

[a] Continuous replacement via a drip system

Test Organism

Species and Lot Number	*Hyalella azteca*, FCETL Lot 10-030
Age	8 – 10 days
Size (pre-test wt.)	0.04196 mg/organism (mean)
Source	Aquatic BioSystems (ABS), Fort Collins, CO
Overlying Water	Moderately Hard Reconstituted Water with added chloride (52 mg/L) as NaCl, RW # 9656
Reference Toxicant Testing	Initiated September 17, 2010 using sodium chloride (NaCl)

TEST RESULTS

Biological Data – Survival and Dry Weight

Sample ID	Percent Survival[a]	Dry Weight (mg)	
		Per original organism	Per surviving organism
Sand Control	100	0.150	0.150
Lab. Formulated Sediment Control	81.25	0.072	0.088
Johnson Creek	91.25	0.119	0.131
Lower Slate Creek	92.5	0.106	0.115
Middle Slate Creek	90	0.106	0.117
Sherman Creek	96.25	0.142	0.148
Control Performance	Acceptable	Acceptable	N/A

[a] There was a statistically significant difference between the Sand control and the Formulated Sediment control for survival; therefore, the Formulated Sediment control was used for all statistical comparisons.
Note: See Appendix B for test data sheets

Data Analysis

For each test metric (survival, weight/original organism and weight/surviving organism), the Sand and Formulated Sediment controls were compared using a T-test. Because there was a significant (α=0.05) difference between the two controls, all statistical comparisons were made against the Formulated Sediment control since the organic content of the Formulated Sediment is more reflective of the organic content of the test sediments.

Biological Endpoint	Comparison[a]	Procedure
Survival	Normality	Inspection
	Homogeneity of Variance	Inspection
	Significant Reduction Relative to the Formulated Sediment Control	Inspection
Growth (Dry Wt. per Original Organism)	Normality	Inspection
	Homogeneity of Variance	Inspection
	Significant Reduction Relative to the Formulated Sediment Control	Inspection
Growth (Dry Wt. per Surviving Organism)	Normality	Inspection
	Homogeneity of Variance	Inspection
	Significant Reduction Relative to the Formulated Sediment Control	Inspection

[a] Using Toxstat Version 3.5 (WEST, Inc. and Gulley 1996)

Analytical Data

Parameter	Sample Identification			
	Johnson Creek	Lower Slate Creek	Middle Slate Creek	Sherman Creek
Metals (mg/kg-dry)[a]				
Aluminum	17,400	17,800	22,300	18,100
Chromium	35.9	37.5 J	45.0 J	37.4
Zinc	126	1,920	2,140	126
Arsenic	25.0	38.5	48.8	74.3
Cadmium	0.454	34.8	32.0	0.424
Copper	155	174	203	103
Lead	16.4	13.6	16.6	18.7
Nickel	32.7	152	168	38.7
Selenium	0.296 J	6.00	8.70	0.585
Silver	0.746	0.416 J	0.534 J	0.328
Mercury	0.156 J	0.188 J	0.179 J	0.0757 J
Particle Size (%)[b]				
Clay	18.0	32.0	28.0	7.0
Sand	50.0	34.0	28.0	78.0
Silt	32.0	34.0	44.0	15.0
Texture	Loam	Clay Loam	Clay Loam	Loamy Sand
Coarse Material (≥2 mm)	4.05	5.58	3.03	7.16
TOC (%-dry)[c]	7.86	17.6	18.9	3.10
Acid Volatile Sulfide (umoles/g)	2.08	9.90	5.79	1.93

[a] Al, Cr, and Zn by SW-846 Method 6010B; As, Cd, Cu, Pb, Ni, Se and Ag by SW-846 Method 6020; Hg by SW-846 7471B (USEPA 1986)
[b] Particle size was determined using ASTM Method D422 and Modified ASA 15-5
[c] TOC was determined using the Walkley Black Method
J = The concentration was below the Reporting Limit but above the Method Detection Limit
Note: See Appendix C for a copy of the report from the analytical laboratory (MSE-TA Analytical Laboratory, Butte, MT)

Total and Total Volatile Solids

Sample ID	Percent Total Solids[a]	Percent Total Volatile Solids[b]
Johnson Creek	46.90	13.03
Lower Slate Creek	16.78	30.12
Middle Slate Creek	16.09	27.31
Sherman Creek	66.60	3.87

[a] Total solids were determined using Standard Methods 2540B (APHA 1998)
[b] Total volatile solids were determined using Standard Methods 2540E (APHA 1998)
All values are means of two analyzed samples
Note: See Appendix B for data sheets (these parameters were determined at the AECOM/FCETL)

Physical and Chemical Data (Min/Max)

Sample ID	pH (units)	DO (mg/L)	Cond. (µS/cm)	Temp. (°C)[a]	Ammonia as N (mg/L)	Hardness (mg/L as $CaCO_3$)	Alkalinity (mg/L as $CaCO_3$)
Sand Control	7.9/8.2	6.0/6.8	486/576	22/25	<1.0	90/104	70/78
Lab. Form. Sed.	7.8/8.1	5.4/6.6	497/607	22/25	<1.0	100/128	72/106
Johnson Creek	7.5/7.8	5.0/6.4	461/559	22/25	1.1/>3.0	106/114	88/115
Lower Slate Creek	7.7/7.9	5.3/6.4	464/559	22/25	<1.0/1.6	122/136	97/109
Middle Slate Creek	7.8/7.9	5.3/6.2	463/538	22/25	<1.0/1.6	110/120	88/100
Sherman Creek	7.7/8.0	5.7/6.3	445/536	22/25	<1.0	104/106	67/80

[a] Temperature in test chambers
[b] Conductivity was not measured at test initiation

Reference Toxicant Test Results for *H. azteca*

Organism Lot Number	Test Dates	96-Hour LC_{50}	AECOM/FCETL Historical 95% Control Limits	
			Low	High
10-030	09/17/10 to 09/21/10	1521	991	3207

Note: Values are expressed as mg/L chloride

References

APHA. 1998. Standard Methods for the Examination of Water and Wastewater. Amer. Public Health Assoc., Amer. Water Works Assoc., Water Pollut. Control Fed., APHA, Washington, DC.

ASTM. 2006. Standard Test Method for Measuring the Toxicity of Sediment-Associated Contaminants with Fresh Water Invertebrates. Method E 1706-05 In *2006 Annual Book of ASTM Standards, Section 11, Water and Environmental Technology, Volume 11.06, Biological Effects and Environmental Fate; Biotechnology*. American Society of Testing and Materials. Conshohocken, PA.

Kemble, N.E., F.J. Dwyer, C.G. Ingersoll, T.D. Dawson, and T.J. Norberg-King. 1999. Tolerance of Freshwater Test Organisms to Formulated Sediments for Use as Control Materials in Whole-Sediment Toxicity Test. *Environ. Toxicol. Chem.* 18:222-230.

USEPA. 1986. Test Methods for Evaluating Solid Waste. Third Edition. SW-846.

USEPA. 2000. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates. EPA/600/R-99/064.

USEPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition. EPA-821-R-02-012.

Statement of Procedural Compliance

I certify that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge, accurate and complete.

David A. Pillard 29 Nov 2010

David A. Pillard, Ph.D. Date
Study Director

Statement of Quality Assurance

The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with standard operating procedures, and that the resulting data and report meet the requirements of the NELAC standards. This report is an accurate reflection of the raw data.

Anita Rehner November 29, 2010

Quality Assurance Unit Date

APPENDIX A

Chain of Custody

AECOM

CHAIN OF CUSTODY RECORD

Page ____ of ____

Client/Project Name: COEUR ALASKA

Project Location: JUNEAU, ALASKA

Project Number: KENSINGTON 2010

Field Logbook No.:

Sampler (Print Name)/(Affiliation): LIZ FLORY, AQUATIC SCIENCE INC.

Chain of Custody Tape Nos.: 42389 (intact)

Signature: Liz Flory

Send Results/Report to: LIZ FLORY, lizflory@msn.com

TAT: 30 DAYS

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	METALS	TOXICITY		Lab I.D.	Remarks
JOHNSON CREEK	8-18-10	14:13	X		GLASS	SEDIMENT	COOL	NO	✓		rec. 2x analytical	23992	
JOHNSON CREEK	8-18-10	14:15	X		4L POLY	SEDIMENT	COOL	NO		✓		23991	
SHERMAN CREEK	8-16-10	15:30	X		GLASS	SD	COOL	NO	✓		rec. 2x analytical	23994	
SHERMAN CREEK 1-2	8-16-10	15:30	X		2x 4L POLY	SD	COOL	NO		✓	rec. 2x 4L jars	23993	
MIDDLE SLATE	8-11-10	11:30	X		GLASS	SD	COOL	NO	✓			23996 ①	
MIDDLE SLATE	8-11-10	11:30	X		4L POLY	SD	COOL	NO		✓		23965	
LOWER SLATE	8-11-10	17:00	X		GLASS	SD	COOL	NO	✓			23998	
LOWER SLATE	8-11-10	17:00	X		4L POLY	SD	COOL	NO		✓		23997	

Relinquished by: (Print Name)/(Affiliation)	Date/Time	Received by: (Print Name)/(Affiliation)	Date/Time
Liz Flory Signature:	Date: 8/24/10 Time: 1230	Ashley Romero (FCETL) Signature: Ashley Romero	Date: 8/26/10 Time: 1105
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:

Analytical Laboratory (Destination): Cooler temp: 11.0°C Recieved on ice

AECOM Toxicology Lab
4303 W. Laporte Avenue
Fort Collins, CO 80521
(970) 416-0916
(970) 490-2963 (FAX)

Sample Shipped Via: UPS FedEx (Courier) Other

Temp blank: Yes No

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_Ft. Collins_10_07.doc

① 08/26/10E

Serial No. 050468

APPENDIX B

Data Sheets

DAP 11/19/10
as: MR 12/31/10

H. azteca 10-day Survival and Growth, Testing Cover Page

Project Number: 60147217-058- (050-055) Protocol #: HA3AK.TIE058.007

Test Substance: Sediment

Test Species: *H. azteca* Lot #: 10-030 Age: 8-10 d (7-14 days) Supplier: ABS

Test Type: Chronic, Static Renewal

Overlying Water: ③ ~~Reconstituted Fresh Water (Smith et al., 1997)~~ Investigators: CW/AP/ES/BS/AM/DAP/

Sampling Date(s): 8/18/10, 8/11/10, 8/11/10, 8/16/10 Sampling Time(s): 1415, 1700, 1130, 1630

FCETL Sample #(s): 23991, 23997, 23995, 23993

Test Initiation Date/Time: 9/17/10 @ 1415

Test Termination Date/Time: ~~10/1/10 @ 1630~~ 9/27/10

Renewal Frequency: Cont. drip, 2+ vol/da Feeding Freq: daily Food Type/Amount: 1 ml YTC daily Test Temp: 23 +/- 1 deg C

Test Chamber Capacity: 500-ML Test Soltn. Vol: 100 mL sed/175 mL H2O # Repl's/Trtmnt: 8/4

Test Duration: 10 days # Org.'s/Repl: 10 Env. Chmbr/Bath:

Water Characterization: Minimum of Hardness, Alkalinity, & Conductivity on days 0 and 10; Ammonia on days 0, 3, 7, and 10; No TRC; pH, temperature & DO daily on overlying water
aerate if dissolved oxygen <2.5 mg/L

Test Sediment (s):

1)	Sand (cont)	2)		Form sed (cont)	3)		Johnson Creek
4)	Lower Slate Creek	5)	②	Slate Creek	6)	④	~~Middle~~ Sherman
7)		8)			9)		
10)		11)					

Reference Tox. Dates: 9/17/10 to 9/21/10 LC50: 1521 mg/L CL Hist. Limits: 991-3207 Method: FSK

Study Director Initials: DAP Date: 9/16/10

Overlying water added at a minimum of 2 volume additions/day; equivalent to >350 ml/day or >0.24 ml/min
~~* 4 replicates for the W. Bearskin Lake treatment, not enough volume for 8~~ ①

DAP 10/20/10 ② Slate Creek = Middle Slate on COC (DAP)

③ Mod Hard w 50 mg Cl/L (RW # 9656). Cl⁻ = 52.4 mg/L (DAP)

④ DAP 11/22/10 E (Sherman = combination of Lower & Middle Sherman sediment)

BIOLOGICAL DATA 9/27/10 *H. azteca* Chronic, Static Renewal Project 60147217-058- (050-055)

QA: AR 10/05/10

DAP 11/19/10

Sediment	Test Termination	A	B	C	D	E	F	G	H	Remarks: % survival
Sand (cont)	# Surviving	10	10	10	10	10	10	10	10	100%
	# Observed Dead	0	0	0	0	0	0	0	0	
	# Not Found	0	0	0	0	0	0	0	0	
	Initials	aw	ES	aw	ES	aw	ES	ES	aw	
Form sed (cont)	# Surviving	① 78	7	9	10	7	9	6	9	③ ~~82.1~~%
	# Observed Dead	0	0	0	0	1	0	1	0	81.25%
	# Not Found	① 32	3	1	0	2	1	3	1	
	Initials	① aw ES	aw	ES	aw	ES	aw	ES	aw	
Johnson Creek	# Surviving	8	10	9	10	7	10	10	9	91.25%
	# Observed Dead	0	0	0	0	0	0	0	0	
	# Not Found	2	0	1	0	3	0	0	1	
	Initials	ES	aw	aw	BB	aw	ES	BB	[illegible]	
Lower Slate Creek	# Surviving	10	9	③ 87	10	10	10	9	9	92.5%
	# Observed Dead	0	0	0	0	0	0	0	0	
	# Not Found	0	1	② 23	0	0	0	1	1	
	Initials	aw	ES	BB	aw	[illegible]	[illegible]	[illegible]	[illegible]	
Slate Creek	# Surviving	7	10	10	10	7	10	10	8	90%
Middle ④	# Observed Dead	0	0	0	0	1	0	0	0	
	# Not Found	3	0	0	0	2	0	0	2	
	Initials	ES	aw	BB	aw	ES	BB	aw	[illegible]	
~~Middle~~ Sherman	# Surviving	10	10	10	9	10	10	8	10	96.25%
④	# Observed Dead	0	0	0	0	0	0	0	0	
	# Not Found	0	0	0	1	0	0	2	0	
	Initials	aw	aw	BB	[illegible]	[illegible]	BB	[illegible]	BB	
0	# Surviving									
	# Observed Dead									
	# Not Found									
0	# Surviving									
	# Observed Dead									
	# Not Found									
0	# Surviving									
	# Observed Dead									
	# Not Found									
0	# Surviving									
	# Observed Dead									
	# Not Found									
	# Surviving									
	# Observed Dead									
	# Not Found									

① ES 9/27/10 WP
② ES for BB 9/27/10 CF
③ [illegible] 10/1/10 G
④ DAP 11/22/10 E

QA: AR 10/31/10

CHEMICAL DATA (Composite of Overlying Water) *H. azteca* Chronic, Static Renewal Project 60147217-058- (056-055) DAP 11/19/10

Parameter	Sediment	Day 0	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9	Day 10	Day	Meter	Date	Time	Initials
Dissolved	Sand (cont)	6.7	6.7	6.6	6.4	6.4	6.4	6.6	6.0	6.3	6.2	6.2	0	5	9/17/10	1320	CW
Oxygen	Form sed (cont)	6.6	6.5	6.4	6.4	6.2	5.8	6.5	5.6	5.4	5.4	5.5	1	5	9/18/10	1730	AS
(mg/l)	Johnson Creek	5.8	6.4	6.0	5.3	5.7	5.8	5.8	5.8	5.8	5.0	5.4	2	5	9/19/10	1040	ES
	Lower Slate Creek	5.7	6.0	6.0	6.1	5.5	5.8	6.4	6.1	5.3	5.6	5.5	3	5	9/20/10	1645	[illegible]
Middle	Slate Creek	6.0	6.0	6.2	5.5	5.7	5.9	6.2	6.0	5.9	5.6	5.3	4	5	9/21/10	1080	AM
①	~~Middle~~ Sherman	6.0	6.3	6.3	6.1	6.2	6.2	6.3	6.1	6.2	5.7	5.7	5	5	9/22/10	1520	AM
													6	5	9/23/10	1420	AM
													7	5	9/24/10	1510	AS
	0												8	5	9/25/10	0925	[illegible]
	0												9	5	9/26/10	1410	[illegible] ②
	0												10	5	9/27/10	1030	CW
	0																
		A	B	C	D	E	F	G	H	A	B	C					
Temp	Sand (cont)	22	23	22	24	23	24	24	25	24	25	24	0	D47	9/17/10	1320	CW
	Form sed (cont)	23	23	22	23	23	24	23	25	23	25	24	1	D47	9/18/10	1715	ES
(deg C)	Johnson Creek	23	22	22	23	22	23	23	24	23	25	23	2	D47	9/19/10	1040	ES
	Lower Slate Creek	23	22	22	23	22	23	23	24	23	25	24	3	D47	9/20/10	1645	[illegible]
Middle	Slate Creek	23	22	22	23	23	23	23	23	23	25	24	4	D47	9/21/10	1080	AM
①	~~Middle~~ Sherman	23	22	22	23	22	24	23	24	23	25	24	5	D47	9/22/10	1520	AM
													6	D47	9/23/10	1420	AM
													7	D46	9/24/10	1510	AS
	0												8	D46	9/25/10	0925	[illegible]
	0												9	D47	9/26/10	1410	[illegible]
													10	D47	9/27/10	1030	CW
	0																
	0																
		A	B	C	D	E	F	G	H	A	B	C					
pH	Sand (cont)	8.1	8.2	8.2	8.1	8.1	8.1	8.1	7.9	8.0	8.0	8.0	0	12	9/17/10	1320	CW
	Form sed (cont)	8.1	8.1	8.1	8.1	8.0	8.0	8.0	7.8	7.9	7.9	7.8	1	12	9/18/10	1730	AS
	Johnson Creek	7.6	7.8	7.7	7.7	7.8	7.7	7.8	7.6	7.8	7.6	7.5	2	12	9/19/10	1040	ES
	Lower Slate Creek	7.7	7.8	7.8	7.9	7.8	7.8	7.9	7.9	7.8	7.8	7.7	3	12	9/20/10	1645	[illegible]
Middle	Slate Creek	7.9	7.9	7.9	7.9	7.8	7.9	7.9	7.9	7.9	7.8	7.8	4	12	9/21/10	1080	AM
①	~~Middle~~ Sherman	7.9	7.9	7.9	8.0	7.9	7.9	8.0	7.9	7.9	7.9	7.7	5	12	9/22/10	1520	AM
	0												6	12	9/23/10	1420	AM
	0												7	12	9/24/10	1510	AS
	0												8	12	9/25/10	0925	[illegible]
	0												9	12	9/26/10	1415	[illegible] ②
	Replicate	A	B	C	D	E	F	G	H	A	B	C	10	12	9/27/10	1030	CW

① DAP 11/22/10 5

② DAP For Amber Potts 11/24/10

OVERLYING WATER CHARACTERIZATION | *H. azteca* | Chronic, Static Renewal | Project No. 60147217-058-(050-055)

DAP 11/19/10
QA: AR 10/31/10

Sediment	Conductivity (s/cm) Day 0	Conductivity Day 10	Hardness (mg/L as CaCO3) Day 0	Hardness Day 10	Alkalinity (mg/l as CaCO3) Day 0	Alkalinity Day 10	Ammonia (mg/l) Day 0	Ammonia Day 3	Ammonia Day 7	Ammonia Day 10
Sand (cont)	486	576	90	104	70	78	<1.0	NM	NM	<1.0
Form sed (cont)	497	607	100	128	72	106	<1.0			<1.0
Johnson Creek	461	559	106	114	88	115	~~1.6~~ >3.0*			1.1
Lower Slate Creek	464	559	136	122	~~102~~ 109	97	1.6			<1.0
Slate Creek	463	538	120	110	100	88	1.6			<1.0
~~Middle~~ Sherman	445	536	106	104	67	80	<1.0			<1.0
(2) Middle										
0										
Overlying water	~~82~~ 437		82		60		<1.0			
(RW ~~162~~ 2) 0										
56 0										
Cu - 52.4 mg/L										
Meter #	15	15	HH	HH	HH	HH	HA#1			HA#1
Date:	9/17/10	9/27/10	9/17/10	9/27/10	9/17/10	9/27/10	9/17/10			9/27/10
Time:	1500	1000	1500	0930	1500	0930	1540			1030
Initials:	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]

(1) [illegible] 10/20/10 E

NM = not measured

* sample not measured on meter #3

(2) DAP 11/22/10 E

DAILY TESTING LOG | *H. azteca* | Chronic, Static Renewal | Project No. 60147217-058-(050-055)

DAP 11/19/10

Day -1				QA: KR 10/31/10
Day 0	Bath CT = 24.6°C	Range = 24.4-24.8°C	Feeding: @1510	Initials/Date: ewj: 9/17/10
Day 1	Bath CT = ① ~~24.4~~ 24.6 °C	Range = 24.4-24.8°C	Feeding: @1710 ES	Initials/Date: ES 9/18/10
Day 2	Bath CT = 24.4°C	Range = 24.2-24.8°C	Feeding: @1500 BB	Initials/Date: ES 9/19/10
Day 3	Bath CT = 24.6°C	Range = 24.2-24.8°C	Feeding: @1700 AM	Initials/Date: AM 9/20/10
Day 4	Bath CT = 24.6°C	Range = 24.4-24.8°C	Feeding: @1645 *	Initials/Date: AM 9/21/10
Day 5	Bath CT = 24.6°C	Range = 24.4-24.8°C	Feeding: @1620 BB	Initials/Date: AM 9/22/10
Day 6	Bath CT = 24.6°C	Range = 24.2-24.8°C	Feeding: @1445 *	Initials/Date: AM ② 9/23/10
Day 7	Bath CT = 24.4°C	Range = 24.2-24.8°C	Feeding: @1605 AP	Initials/Date: * 9/24/10
Day 8	Bath CT = 24.8°C	Range = 24.0-25.8°C	Feeding: @1615 AP	Initials/Date: ② 9/25 ~~9/24/10~~
Day 9	Bath CT = 24.8°C	Range = 24.4-25.2°C	Feeding: @1515	Initials/Date: * 9/26/10
Day 10	Bath CT = 24.8°C	Range = 24.4-25.2°C	Feeding: None	Initials/Date: CW 9/27/10

① ES 9/18/10 WP
② AM 9/23/10 E

DAP 11/19/10
DAP, ARC 10/31/10

60147217-058-(050-055)

SEDIMENT/SOIL PREPARATION

Artificial soil	
Constituent/source	**Amount added (g)**
Coarse Silica Sand	1242
Silt/Clay (ASP 400)	219
Dolomite	7.5
α-cellulose	77.3
Humic Acid	0.15
Total	1545.95

Notes: Container was placed into tumbler for a minimum of an hour to homogenize prior to use

Soil/sediment	FCETL#	Homogenization			
		Date	From	To	Analyst
Johnson Creek	23991	09/16/10	1203	1210	CN
Lower Slate Creek	23997	09/16/10	1210	1215	ES
Middle Slate Creek	23995	09/16/10	1225	1233	CN
① ~~Middle~~ Sherman	23993	09/16/10	1217	1227	DAP
Control-Sand		9/16/10	1142	1145	CN
Control-Formul.		9/16/10	1149	1153	ES

Note: • Removed sticks/stones from all sediments during mixing (DAP)

① DAP 11/22/10 E

• Also used sieves (U.S. Standard, 11.1mm + 2mm) to remove debris from middle Sherman (DAP)

• Found live oligochaete in middle Sherman + live leech (Hirudinea) in Slate Creek (23995) (DAP)

DAP 11/19/10

Six Treatments Eight Replicates
Random Chart Location "Hyalella"

Test: 60147217-058 - (050-055)

	1	2	3	4	5	6
A	4H	1H	6E	5G	6C	4A
B	2E	2A	3C	2G	5H	6G
C	3H	5F	6B	6D	5A	2D
D	4F	2H	6A	4G	6F	3F
E	1D	2F	4D	3D	3E	5E
F	4C	2B	5C	4B	1E	4E
G	3G	5D	2C	1A	3A	6H
H	1F	1B	1G	1C	5B	3B

① ~~Mac~~ pre-weight pans

FCETL QA Form No. 010
Revision 5
Effective 08/99

Preweights

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 60147217-058-(050-055) Test Substance: Sediment

Species: ① Hyalella azteca Analyst Tare: ES Analyst Gross: AP

Date/Time of Tare Wt.: 9/17/10 @ 1340 Date/Time of Gross Wt.: 9/21/10 @ 0940

Comments: ar: AR 10/05/10 DAP 11/18/10
Analytical Balance ID: Sart #1
Dried in Oven # 3 from Date: 9/17/10 Time: 1425
to Date: 9/21/10 Time: 0845

Weight Type (Circle): Wet Blot Dry (Dry ~~(≥100°C)~~ 60-90 ②) AFDW (>500°C) Lot or Batch Number: 10-030

Boat No.	Treatment	Rep.	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)[1]	No. of Orig. Organisms	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Organisms	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
	1			0.92662	0.92705	0.00043	0.00055	15	0.0366	0.04196	15		
	2			0.92717	0.92771	0.00054	0.00066	15	0.0440		15		
	3			0.92714	0.92758	0.00044	0.00056	15	0.0373		15		
	4			0.92824	0.92877	0.00053	0.00065	15	0.0433		15		
	5			0.92991	0.93052	0.00061	0.00073	15	0.0486		15		
Blank				0.92827	0.92815	-0.00012*							
Range													
Mean													

Test Solution Volume: Loading Rate:

[1] Add in weight loss of blank boat, if appropriate.

① ES 9/17/10 E ② DAP 11/22/10 E * Checked 1.00000g standard - measured @ 1.00000g

"fusia"

FCETL QA Form No. 010
Revision 5
Effective 08/99
DAP 11/19/10

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 60147217-058 (050-055)
Test Substance: Sediment
Comments: QA: AR 10/05/10
Species: H. azteca
Analyst Tare: Amm Analyst Gross: Amm
Analytical Balance ID: Sart #1
Dried in Oven # 3 from Date: 9/27/10 Time: 1725 to Date: 9/30/10 Time: 0845
Date/Time of Tare Wt.: 9/27/10 @ 1315
Date/Time of Gross Wt.: 9/30/10 @ 1440

Weight Type (Circle): Wet Blot Dry (Dry) (~~>100°C~~ 60-90 ①) AFDW (>500°C)
(Lot) or Batch Number: 10-030

Boat No.	Treatment	Rep.	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)[1]	No. of Orig. Organisms	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Organisms	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
	Sand	A		0.93023	0.93185	0.00162		10			10		
		B		0.92448	0.92571	0.00123		10			10		
		C		0.93714	0.93854	0.00140		10			10		
		D		0.93749	0.93882	0.00133		10			10		
		E		0.92497	0.92624	0.00127		10			10		
		F		0.93475	0.93624	0.00149		10			10		
		G		0.93015	0.93159	0.00144		10			10		
		H		0.92468	0.92645	0.00177		10			10		
	Form Sed	A		0.92989	0.93062	0.00073		10			8		
		B		0.92686	0.92736	0.00050		10			7		
		C		0.92804	0.92875	0.00071		10			9		
		D		0.92995	0.93084	0.00089		10			10		
Blank				0.93158	0.93152	-0.00006							
Range													
Mean													

Test Solution Volume:
Loading Rate:

[1] Add in weight loss of blank boat, if appropriate. ① DAP 11-22-10 E

FCETL QA Form No. 010
Revision 5
Effective 08/99
DAP 11/19/10

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 60147217-058-(050055) | Test Substance: Sediment | Comments: QA: AR 10/05/10
Species: H. azteca | Analyst Tare: AM | Analyst Gross: AM | Analytical Balance ID: Sart #1
Date/Time of Tare Wt.: 9/27/10 @ 1315 | Date/Time of Gross Wt.: 9/30/10 @ 1440 | Dried in Oven # 3 from Date: 9/27/10 Time: 1725 to Date: 9/30/10 Time: 0845

Weight Type (Circle): Wet Blot Dry (Dry) (~~>100~~ 60-70 ③°C) AFDW (>500°C) | Lab or Batch Number: 10-030

Boat No.	Treatment	Rep.	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)[1]	No. of Orig. Organisms	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Organisms	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
	Form Sed	E		0.93055	0.93134	0.00079		10			7		
		F		0.93263	0.93330	0.00067		10			9		
		G		0.93066	0.93104	0.00038		10			6		
		H		0.93127	0.93185	0.00058		10			9		
	Johnson	A		0.93584	0.93672	0.00088		10			8		
	Creek	B		0.93175	0.93318	0.00143		10			10		
		C		0.93763	0.93876	0.00113		10			9		
		D		0.93528	0.93635	0.00107		10			10		
		E		0.93742	0.93837	0.00095		10			7		
		F		0.93790	0.93926	0.00136		10			10		
		G		0.93286	0.93395	0.00109		10			10		
		H		0.93591	0.93704	0.00113		10			9		
Blank													
Range													
Mean													

Test Solution Volume: | Loading Rate:

[1] Add in weight loss of blank boat, if appropriate.

① AM 9/27/10 E
② AM 9/30/10 E
③ DAP 11-22-05

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 60147217 - 058 - (050-055)
Test Substance: Sediment
Comments: QA: AV 10/05/10 DAP 11/19/10
Species: H. azteca
Analyst Tare: AM Analyst Gross: AM
Analytical Balance ID: Sart #1
Dried in Oven # 3 from Date: 9/27/10 Time: 1725 to Date: 9/30/10 Time: 0845
Date/Time of Tare Wt.: 9/27/10 @ 1315
Date/Time of Gross Wt.: 9/30/10 @ 1440

Weight Type (Circle): Wet Blot Dry (Dry (~~>100°C~~) 60-90 ①) AFDW (>500°C)
Lot or Batch Number: 10-030

Boat No.	Treatment	Rep.	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)[1]	No. of Orig. Organisms	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Organisms	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
	Lower Slate	A		0.93375	0.98470	0.00095		9			9*		
	Creek	B		0.93261	0.93359	0.00098		10			9		
		C		0.93457	0.93538	0.00081		10			7		
		D		0.93862	0.93958	0.00096		10			10		
		E		0.93316	0.93430	0.00114		10			10		
		F		0.93244	0.93372	0.00128		10			10		
		G		0.93814	0.93897	0.00083		10			9		
		H		0.93714	0.93810	0.00096		10			9		
	Slate	A		0.94029	0.94094	0.00065		10			7		
	Creek	B		0.93908	0.94025	0.00117		10			10		
	(Middle)	C		0.94164	0.94306	0.00142		10			10		
		D		0.93747	0.93831	0.00084		10			10		
Blank													
Range													
Mean													

Test Solution Volume:
Loading Rate:

[1] Add in weight loss of blank boat, if appropriate.

* 9 orgs found in pan, but 10 orgs. originally accounted for.

① DAP 11/22/10

TEST ORGANISM LENGTHS, WEIGHTS, AND LOADING

Project Number: 60147217-058-(050-055) Test Substance: Sediment

Species: H. azteca

Analyst Tare: AM Analyst Gross: AM

Date/Time of Tare Wt.: 9/27/10 @ 1318 Date/Time of Gross Wt.: 9/30/10 @ 1440

Comments: QA: AR 10/05/10 DAP 11/19/10
Analytical Balance ID: Sart #1
Dried in Oven # 3 from Date: 9/27/10 Time: 1725
to Date: 9/30/10 Time: 0845

Weight Type (Circle): Wet Blot Dry Dry (~~>100~~ 60-70 ②°C) AFDW (>500°C) Lot or Batch Number: 10-030

Boat No.	Treatment	Rep.	Length Units:	Tare Weight (g)	Gross Weight (g)	Net Weight (g)	Adjusted Net Weight (g)[1]	No. of Orig. Organisms	Mean Wt. per Original Organism (mg)	Mean Wt. per Treatment (mg) (Original)	No. of Surv. Organisms	Mean Wt. per Surviving Organism (mg)	Mean Wt. per Treatment (mg) (Surviving)
	Slate	E		0.93790	0.93866	0.00076		10			7		
	Creek	F		0.93542	0.93663	0.00121		10			10		
	(Middle)	G		0.93774	0.93891	0.00117		10			10		
		H		0.93518	0.93600	0.00082		10			8		
③	~~Middle~~	A		0.93369	0.93521	0.00152		10			10		
	Sherman	B		0.93678	0.93817	0.00139		10			10		
		C		0.93369	0.93499	0.00130		10			10		
		D		0.93714	0.93852	0.00138		10			9		
		E		0.93732	0.93855	0.00123		10			10		
		F		0.93717	0.93852	0.00135		10			10		
		G		0.93191	0.93322	0.00131	①	10			8		
		H		0.93580	0.93719	0.00139		10			10		
Blank													
Range													
Mean													

Test Solution Volume: Loading Rate:

[1] Add in weight loss of blank boat, if appropriate.

① AR for AMR 10/05/10 ef

② DAP 11/22/10 E

③ DAP 11/22/10 E

OA 11/29/10

QA: AZ 11/29/10

Spreadsheet for Determining Dry Weight of Hyalella azteca

Test Start Date:	9/17/2010	Test End Date:	9/27/2010
Test Number(s):	60147217-058- (050-055)	Test Material:	Sediment
Species:	Hyalella azteca (Lot 10-030)	Entered by:	K. Tapp

Boat #	Treatment	Rep	Length	Tare wt (dry) (g)	Gross wt (dry) (g)	Dry Net wt (g)	Dry adjusted net wt (g)	Number Original Organisms	Mean wt per org (mg)	Mean wt per treatment (orig) (mg)	Number Surviving	Mean wt per surviving (mg)	Mean wt per treatment (surv) (mg)
1	Sand	A		0.93023	0.93185	0.00162	0.00168	10	0.168	-	10	0.168	-
2	Sand	B		0.92448	0.92571	0.00123	0.00129	10	0.129	-	10	0.129	-
3	Sand	C		0.93714	0.93854	0.00140	0.00146	10	0.146	-	10	0.146	-
4	Sand	D		0.93749	0.93882	0.00133	0.00139	10	0.139	-	10	0.139	-
5	Sand	E		0.92497	0.92624	0.00127	0.00133	10	0.133	-	10	0.133	-
6	Sand	F		0.93475	0.93624	0.00149	0.00155	10	0.155	-	10	0.155	-
7	Sand	G		0.93015	0.93159	0.00144	0.00150	10	0.150	-	10	0.150	-
8	Sand	H		0.92468	0.92645	0.00177	0.00183	10	0.183	0.15037	10	0.183	0.15037
9	Formulated Sed	A		0.92989	0.93062	0.00073	0.00079	10	0.079	-	8	0.099	-
10	Formulated Sed	B		0.92686	0.92736	0.00050	0.00056	10	0.056	-	7	0.080	-
11	Formulated Sed	C		0.92804	0.92875	0.00071	0.00077	10	0.077	-	9	0.086	-
12	Formulated Sed	D		0.92995	0.93084	0.00089	0.00095	10	0.095	-	10	0.095	-
13	Formulated Sed	E		0.93055	0.93134	0.00079	0.00085	10	0.085	-	7	0.121	-
14	Formulated Sed	F		0.93263	0.93330	0.00067	0.00073	10	0.073	-	9	0.081	-
15	Formulated Sed	G		0.93066	0.93104	0.00038	0.00044	10	0.044	-	6	0.073	-
16	Formulated Sed	H		0.93127	0.93185	0.00058	0.00064	10	0.064	0.07162	9	0.071	0.08829
17	Johnson Creek	A		0.93584	0.93672	0.00088	0.00094	10	0.094	-	8	0.117	-
18	Johnson Creek	B		0.93175	0.93318	0.00143	0.00149	10	0.149	-	10	0.149	-
19	Johnson Creek	C		0.93763	0.93876	0.00113	0.00119	10	0.119	-	9	0.132	-
20	Johnson Creek	D		0.93528	0.93635	0.00107	0.00113	10	0.113	-	10	0.113	-
21	Johnson Creek	E		0.93742	0.93837	0.00095	0.00101	10	0.101	-	7	0.144	-
22	Johnson Creek	F		0.93790	0.93926	0.00136	0.00142	10	0.142	-	10	0.142	-
23	Johnson Creek	G		0.93286	0.93395	0.00109	0.00115	10	0.115	-	10	0.115	-
24	Johnson Creek	H		0.93591	0.93704	0.00113	0.00119	10	0.119	0.11900	9	0.132	0.13065
25	Lower Slate	A		0.93375	0.93470	0.00095	0.00101	9	0.112	-	9	0.112	-
26	Lower Slate	B		0.93261	0.93359	0.00098	0.00104	10	0.104	-	9	0.116	-
27	Lower Slate	C		0.93457	0.93538	0.00081	0.00087	10	0.087	-	7	0.124	-
28	Lower Slate	D		0.93862	0.93958	0.00096	0.00102	10	0.102	-	10	0.102	-
29	Lower Slate	E		0.93316	0.93430	0.00114	0.00120	10	0.120	-	10	0.120	-
30	Lower Slate	F		0.93244	0.93372	0.00128	0.00134	10	0.134	-	10	0.134	-
31	Lower Slate	G		0.93814	0.93897	0.00083	0.00089	10	0.089	-	9	0.099	-
32	Lower Slate	H		0.93714	0.93810	0.00096	0.00102	10	0.102	0.10628	9	0.113	0.11504
33	Middle Slate Creek	A		0.94029	0.94094	0.00065	0.00071	10	0.071		7	0.101	-
34	Middle Slate Creek	B		0.93908	0.94025	0.00117	0.00123	10	0.123	-	10	0.123	-
35	Middle Slate Creek	C		0.94164	0.94306	0.00142	0.00148	10	0.148	-	10	0.148	-
36	Middle Slate Creek	D		0.93747	0.93831	0.00084	0.00090	10	0.090	-	10	0.090	-
37	Middle Slate Creek	E		0.93790	0.93866	0.00076	0.00082	10	0.082	-	7	0.117	-
38	Middle Slate Creek	F		0.93542	0.93663	0.00121	0.00127	10	0.127	-	10	0.127	-
39	Middle Slate Creek	G		0.93774	0.93891	0.00117	0.00123	10	0.123	-	10	0.123	-
40	Middle Slate Creek	H		0.93518	0.93600	0.00082	0.00088	10	0.088	0.10650	8	0.110	0.11745
41	Sherman	A		0.93369	0.93521	0.00152	0.00158	10	0.158	-	10	0.158	-
42	Sherman	B		0.93678	0.93817	0.00139	0.00145	10	0.145	-	10	0.145	-
43	Sherman	C		0.93369	0.93499	0.00130	0.00136	10	0.136	-	10	0.136	-
44	Sherman	D		0.93714	0.93852	0.00138	0.00144	10	0.144	-	9	0.160	-
45	Sherman	E		0.93732	0.93855	0.00123	0.00129	10	0.129	-	10	0.129	-
46	Sherman	F		0.93717	0.93852	0.00135	0.00141	10	0.141	-	10	0.141	-
47	Sherman	G		0.93191	0.93322	0.00131	0.00137	10	0.137	-	8	0.171	-
48	Sherman	H		0.93580	0.93719	0.00139	0.00145	10	0.145	0.14187	10	0.145	0.14816
Blank				0.93158	0.93152	-6E-05							

10/1/10
QA: AR 10/05/10

Toxstat version 3.5
Study #60147217-058-(050-055)
Coeur 10- day Sediment Test
Hyalella azteca
Summary of Survival

File: 058hs.dat Transform: NO TRANSFORMATION

Summary Statistics on Data TABLE 1 of 2

GRP	IDENTIFICATION	N	MIN	MAX	MEAN
1	Sand Control	8	1.0000	1.0000	1.0000
2	Form Sed	8	0.6000	1.0000	0.8125
3	Johnson Creek	8	0.7000	1.0000	0.9125
4	Lower Slate	8	0.7000	1.0000	0.9250
5	Slate Creek	8	0.7000	1.0000	0.9000
6	Middle Sherman	8	0.8000	1.0000	0.9625

Summary Statistics on Data TABLE 2 of 2

GRP	IDENTIFICATION	VARIANCE	SD	SEM	C.V. %
1	Sand Control	0.0000	0.0000	0.0000	0.0000
2	Form Sed	0.0184	0.1356	0.0479	16.6917
3	Johnson Creek	0.0127	0.1126	0.0398	12.3396
4	Lower Slate	0.0107	0.1035	0.0366	11.1903
5	Slate Creek	0.0200	0.1414	0.0500	15.7135
6	Middle Sherman	0.0055	0.0744	0.0263	7.7301

File: 058hs.dat Transform: ARC SINE(SQUARE ROOT(Y))

t-Test of Solvent and Blank Controls Ho: GRP1 Mean = GRP2 Mean

GRP1 (Solvent cntl) Mean = 1.4120 Calculated t value = 4.3155
GRP2 (Blank cntl) Mean = 1.1418 Degrees of freedom = 14
Difference in means = 0.2702

2-sided t value (0.05,14) = 2.1448** Significant difference at alpha=0.05
2-sided t value (0.01,14) = 2.9768** Significant difference at alpha=0.10

WARNING: This procedure assumes normality and equal variances!

Significant difference between Sand and Formulated Control sediment; use Formulated control sediment for comparisons

FCETL QA Form No.131
Revision 0
Effective 10/06
DAP 11/24/10

PERCENT TOTAL SOLIDS AND PERCENT TOTAL VOLATILE SOLIDS (TVS)

Project No: 60147219-058 ①

Analytical Balance ID: A+D #1

TARE: Date/time: 10/5/10 @ 1515 Analyst: DAP

DRY GROSS: Date/time: 10/7/10 @ 1030 Analyst: DAP

ASHED GROSS: Date/time: 10/15/10 @ 1800 Analyst: DAP

Dried in Oven # 1 from Date: 10/5/10 Time: 1800
Oven °C: 104 to Date: 10/6/10 Time: 1800

Ashed in Furnace from Date: 10/8/10 Time: 1210
Furnace °C: 500 to Date: 10/8/10 Time: 1620

Dish No.	Treatment	Rep	Tare Weight of Dish (g) A	Dish + Wet Sample (g) B	Dry Gross Weight (g) (dish + dry sample) C	% Total Solids (g) [(C-A)(100)]/(B-A)	Ashed Gross Weight (dish + sample)(g) D	% Total Volatile Solids (g) [(C-D)(100)]/(C-A)
15	Johnson Cr.	A	18.3876	41.9384	29.4457		28.027 ② 80	
10	"	B	18.0146	38.1657	27.4551		26.2057	
26	Lower Slate	A	19.0543	34.8938	21.7236		20.9226	
7	"	B	19.9945	38.8426	23.1426		22.1907	
28	③ Slate	A	18.1438	35.0827	20.8573		20.1236	
21	③ Slate	B	19.9271	33.2610	22.0819		21.4875	
19	④ ~~Middle~~ Shermax	A	18.0640	40.7629	34.2889		33.6929	
16	"	B	19.1703	45.3521	35.3308		34.6747	
Blank	(1)		20.2119		20.2118		20.2119	

[1] Add in weight loss of blank boat, if appropriate.

① DAP 10/5/10 E ② DAP 10/15/10 E ③ Middle Slate (DAP 11/22/10) ④ DAP 11/22/10 E

FCETL QA Form No. 132
Revision 0
Effective 10/09

DAP 11/24/10
QA: AR 11/29/10

Percent Total Solids and Percent Total Volatile Solids

Project Number: 60147217-058- (050-055)

Treatment	Rep		Tare Weight (g) A	Dish + Wet Sample (g) B	Dry Gross Weight (g) (dish + dry sample) C	% Total Solids [(C-A)(100)]/(B-A)	Treatment Mean % Total Solids	Ashed Gross Weight (g) (dish + sample) D	% Total Volatile Solids [(C-D)(100)]/(C-A)	Treatment Mean % Total Volatile Solids
Johnson Creek	A		18.3876	41.9384	29.4457	46.9542	46.9014	28.0280	12.8205	13.0275
	B		18.0146	38.1657	27.4551	46.8486		26.2057	13.2345	
Lower Slate Cr.	A		19.0543	34.8938	21.7236	16.8522	16.7773	20.9226	30.0079	30.1226
	B		19.9945	38.8426	23.1426	16.7025		22.1907	30.2373	
Middle Slate Cr.	A		18.1438	35.0827	20.8573	16.0193	16.0898	20.1236	27.0389	27.3119
	B		19.9271	33.2610	22.0819	16.1603		21.4875	27.5849	
Sherman Cr.	A		18.0640	40.7629	34.2889	71.4788	66.6015	33.6929	3.6734	3.8666
	B		19.1703	45.3521	35.3308	61.7242		34.6747	4.0599	
Blank			20.2119		20.2118			20.2119		

APPENDIX C

Analytical Data

Thursday, November 04, 2010

Analytical Laboratory

Dave Pillard
AECOM
4303 W Laporte Ave
Fort Collins, CO 80521

RE: PROJECT NO. 60147217-058 Work Order: 1010004

Dear Dave Pillard:

MSE Lab Services received 8 sample(s) on 9/30/2010 for the analyses presented in the following report.

Please find enclosed analytical results for the sample(s) received at the MSE Laboratory.

If you have any questions regarding these test results, please feel free to call.

Sincerely,

Sara Ward

Sara Ward
Laboratory Manager
406-494-7334

Enclosure

MSE Analytical Laboratory
P.O. Box 4078
200 Technology Way
Butte, MT 59701
Lab: 406-494-7334
Fax: 406-494-7230
labinfo@mse-ta.com

E-MAILED
11/8/10 SW

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-001

Client Sample ID: 23991-JOHNSON CREEK
Collection Date: 9/16/2010 4:00:00 PM
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
SW-846-ICP-AES TOTAL METALS			**SW6010B**	**SW3050B**			Analyst: **MC**
Aluminum	17400	6.40	24.3		mg/Kg-dry	1	10/21/2010
Chromium	35.9	8.75	20.3		mg/Kg-dry	1	10/21/2010
Zinc	126	5.67	20.3		mg/Kg-dry	1	10/21/2010
ICP-MS METALS, SOLID SAMPLES			**SW6020**	**SW3050B**			Analyst: **kgw**
Arsenic	25.0	0.176	0.608		mg/Kg-dry	2	10/26/2010
Cadmium	0.454	0.011	0.041		mg/Kg-dry	2	10/26/2010
Copper	155	0.186	0.506		mg/Kg-dry	2	10/26/2010
Lead	16.4	0.018	0.081		mg/Kg-dry	2	10/26/2010
Nickel	32.7	0.116	0.405		mg/Kg-dry	2	10/26/2010
Selenium	0.296	0.275	0.810	J	mg/Kg-dry	2	10/26/2010
Silver	0.746	0.149	0.405		mg/Kg-dry	2	10/26/2010
MERCURY IN SOIL/SEDIMENT - SW846 7471B			**E245.5**	**SW7471A**			Analyst: **kgw**
Mercury	0.156	0.0608	0.209	J	mg/Kg-dry	1	10/28/2010
ORGANIC MATTER-WALKLEY BLACK		**OM_WALKLEYBLACK**					Analyst: **YF**
Organic Matter - Walkley Black	7.86	0.09	0.20		%	1	10/21/2010
PERCENT COARSE MATERIAL			**ASTMD422**				Analyst: **dk**
1" Gradation	ND	0.05	0.10		%	1	10/15/2010
2mm Gradation	4.05	0.05	0.10		%	1	10/15/2010
RAPID HYDROMETER (2 HOUR) MOD ASA 15-5			**MSA15-5**				Analyst: **dk**
% Clay	18.0	0.1	0.1		%	1	10/18/2010
% Sand	50.0	0.1	0.1		%	1	10/18/2010
% Silt	32.0	0.1	0.1		%	1	10/18/2010
Soil Class	LOAM					1	10/18/2010
PERCENT MOISTURE			**D2216**				Analyst: **dk**
Percent Moisture	50.6	0.01	0.05		wt%	1	10/20/2010

KW **Review**

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-002

Client Sample ID: 23992-JOHNSON CREEK
Collection Date: 8/8/2010
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
ACID VOLATILE SULFIDE-SIM. EXT. METALS			**AVS-SEM**				Analyst: **kgw**
Sulfide	2.08	0.55	1.50		µmoles/g	1	10/11/2010

KW **Review**

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-003

Client Sample ID: 23993-MIDDLE SHERMAN
Collection Date: 9/16/2010 4:00:00 PM
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
SW-846-ICP-AES TOTAL METALS			**SW6010B**	**SW3050B**			Analyst: **MC**
Aluminum	18100	4.14	15.7		mg/Kg-dry	1	10/21/2010
Chromium	37.4	5.66	13.1		mg/Kg-dry	1	10/21/2010
Zinc	126	3.67	13.1		mg/Kg-dry	1	10/21/2010
ICP-MS METALS, SOLID SAMPLES			**SW6020**	**SW3050B**			Analyst: **kgw**
Arsenic	74.3	0.114	0.393		mg/Kg-dry	2	10/26/2010
Cadmium	0.424	0.007	0.026		mg/Kg-dry	2	10/26/2010
Copper	103	0.108	0.328		mg/Kg-dry	2	10/26/2010
Lead	18.7	0.012	0.052		mg/Kg-dry	2	10/26/2010
Nickel	38.7	0.075	0.262		mg/Kg-dry	2	10/26/2010
Selenium	0.585	0.178	0.524		mg/Kg-dry	2	10/26/2010
Silver	0.328	0.097	0.262		mg/Kg-dry	2	10/26/2010
MERCURY IN SOIL/SEDIMENT - SW846 7471B			**E245.5**	**SW7471A**			Analyst: **kgw**
Mercury	0.0757	0.0419	0.144	J	mg/Kg-dry	1	10/28/2010
ORGANIC MATTER-WALKLEY BLACK		**OM_WALKLEYBLACK**					Analyst: **YF**
Organic Matter - Walkley Black	3.10	0.09	0.20		%	1	10/21/2010
PERCENT COARSE MATERIAL			**ASTMD422**				Analyst: **dk**
1" Gradation	ND	0.05	0.10		%	1	10/15/2010
2mm Gradation	7.16	0.05	0.10		%	1	10/15/2010
RAPID HYDROMETER (2 HOUR) MOD ASA 15-5			**MSA15-5**				Analyst: **dk**
% Clay	7.0	0.1	0.1		%	1	10/18/2010
% Sand	78.0	0.1	0.1		%	1	10/18/2010
% Silt	15.0	0.1	0.1		%	1	10/18/2010
Soil Class	LOAMY SAND					1	10/18/2010
PERCENT MOISTURE			**D2216**				Analyst: **dk**
Percent Moisture	23.7	0.01	0.05		wt%	1	10/20/2010

Review

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-004

Client Sample ID: 23994-SHERMAN
Collection Date: 8/16/2010
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
ACID VOLATILE SULFIDE-SIM. EXT. METALS			**AVS-SEM**				Analyst: **kgw**
Sulfide	1.93	0.55	1.50		µmoles/g	1	10/11/2010

KW **Review**

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-005

Client Sample ID: 23995-SLATE
Collection Date: 9/16/2010 4:00:00 PM
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
SW-846-ICP-AES TOTAL METALS			**SW6010B**	**SW3050B**			Analyst: **MC**
Aluminum	22300	14.5	55.0		mg/Kg-dry	1	10/21/2010
Chromium	45.0	19.8	45.8	J	mg/Kg-dry	1	10/21/2010
Zinc	2140	12.8	45.8		mg/Kg-dry	1	10/21/2010
ICP-MS METALS, SOLID SAMPLES			**SW6020**	**SW3050B**			Analyst: **kgw**
Arsenic	48.8	0.399	1.38		mg/Kg-dry	2	10/26/2010
Cadmium	32.0	0.024	0.092		mg/Kg-dry	2	10/26/2010
Copper	203	0.376	1.15		mg/Kg-dry	2	10/26/2010
Lead	16.6	0.041	0.183		mg/Kg-dry	2	10/26/2010
Nickel	168	0.263	0.917		mg/Kg-dry	2	10/26/2010
Selenium	8.70	0.623	1.83		mg/Kg-dry	2	10/26/2010
Silver	0.534	0.338	0.917	J	mg/Kg-dry	2	10/26/2010
MERCURY IN SOIL/SEDIMENT - SW846 7471B			**E245.5**	**SW7471A**			Analyst: **kgw**
Mercury	0.179	0.135	0.465	J	mg/Kg-dry	1	10/28/2010
ORGANIC MATTER-WALKLEY BLACK			**OM_WALKLEYBLACK**				Analyst: **YF**
Organic Matter - Walkley Black	18.9	0.09	0.20		%	1	10/21/2010
PERCENT COARSE MATERIAL			**ASTMD422**				Analyst: **dk**
1" Gradation	ND	0.05	0.10		%	1	10/15/2010
2mm Gradation	3.03	0.05	0.10		%	1	10/15/2010
RAPID HYDROMETER (2 HOUR) MOD ASA 15-5			**MSA15-5**				Analyst: **dk**
% Clay	28.0	0.1	0.1		%	1	10/18/2010
% Sand	28.0	0.1	0.1		%	1	10/18/2010
% Silt	44.0	0.1	0.1		%	1	10/18/2010
Soil Class	CLAY LOAM					1	10/18/2010
PERCENT MOISTURE			**D2216**				Analyst: **dk**
Percent Moisture	78.2	0.01	0.05		wt%	1	10/20/2010

KW **Review**

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-006

Client Sample ID: 23996-MIDDLE SLATE
Collection Date:
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
ACID VOLATILE SULFIDE-SIM. EXT. METALS			**AVS-SEM**				Analyst: **kgw**
Sulfide	5.79	0.55	1.50		µmoles/g	1	10/11/2010

Review

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-007

Client Sample ID: 23997-LOWER SLATE
Collection Date: 9/16/2010 4:00:00 PM
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
SW-846-ICP-AES TOTAL METALS			**SW6010B**	**SW3050B**			Analyst: **MC**
Aluminum	17800	15.0	57.1		mg/Kg-dry	1	10/21/2010
Chromium	37.5	20.6	47.6	J	mg/Kg-dry	1	10/21/2010
Zinc	1920	13.3	47.6		mg/Kg-dry	1	10/21/2010
ICP-MS METALS, SOLID SAMPLES			**SW6020**	**SW3050B**			Analyst: **kgw**
Arsenic	38.5	0.414	1.43		mg/Kg-dry	2	10/26/2010
Cadmium	34.8	0.025	0.095		mg/Kg-dry	2	10/26/2010
Copper	174	0.391	1.19		mg/Kg-dry	2	10/26/2010
Lead	13.6	0.043	0.190		mg/Kg-dry	2	10/26/2010
Nickel	152	0.273	0.952		mg/Kg-dry	2	10/26/2010
Selenium	6.00	0.647	1.90		mg/Kg-dry	2	10/26/2010
Silver	0.416	0.351	0.952	J	mg/Kg-dry	2	10/26/2010
MERCURY IN SOIL/SEDIMENT - SW846 7471B			**E245.5**	**SW7471A**			Analyst: **kgw**
Mercury	0.188	0.141	0.486	J	mg/Kg-dry	1	10/28/2010
ORGANIC MATTER-WALKLEY BLACK			**OM_WALKLEYBLACK**				Analyst: **YF**
Organic Matter - Walkley Black	17.6	0.09	0.20		%	1	10/21/2010
PERCENT COARSE MATERIAL			**ASTMD422**				Analyst: **dk**
1" Gradation	ND	0.05	0.10		%	1	10/15/2010
2mm Gradation	5.58	0.05	0.10		%	1	10/15/2010
RAPID HYDROMETER (2 HOUR) MOD ASA 15-5			**MSA15-5**				Analyst: **dk**
% Clay	32.0	0.1	0.1		%	1	10/18/2010
% Sand	34.0	0.1	0.1		%	1	10/18/2010
% Silt	34.0	0.1	0.1		%	1	10/18/2010
Soil Class	CLAY LOAM					1	10/18/2010
PERCENT MOISTURE			**D2216**				Analyst: **dk**
Percent Moisture	79.0	0.01	0.05		wt%	1	10/20/2010

KW **Review**

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

MSE Lab Services

Date: *04-Nov-10*

CLIENT: AECOM
Lab Order: 1010004
Project: PROJECT NO. 60147217-058
Lab ID: 1010004-008

Client Sample ID: 23998-LOWER SLATE
Collection Date: 8/16/2010
Matrix: SEDIMENT

Analyses	Result	MDL	Rpt Limit	Qualifier	Units	DF	Date Analyzed
ACID VOLATILE SULFIDE-SIM. EXT. METALS			**AVS-SEM**				Analyst: **kgw**
Sulfide	9.90	0.55	1.50		µmoles/g	1	10/11/2010

Review

Qualifiers:

E	Value above quantitation range	H	Holding times for preparation or analysis exceeded
J	Analyte detected below the Reporting Limit	Limit	Reporting Limit
MDL	Method Detection Limit	ND	Not Detected at the Method Detection Limit (MDL)

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labinfo@mse-ta.com

Date: 04-Nov-10
Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058
Work Order: 1010004
BatchID: 3871

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: 3871-PB-FILTERED			*Method: SW6010B*		*Batch ID: 3871*			*Analysis Date: 10/21/2010*		
Aluminum	ND	12.0	mg/Kg							
Chromium	ND	10.0	mg/Kg							
Zinc	ND	10.0	mg/Kg							
Sample ID: 3871-PB-UNFILTERED			*Method: SW6010B*		*Batch ID: 3871*			*Analysis Date: 10/21/2010*		
Aluminum	ND	12.0	mg/Kg							
Chromium	ND	10.0	mg/Kg							
Zinc	ND	10.0	mg/Kg							
Sample ID: 3871-LCS			*Method: SW6010B*		*Batch ID: 3871*			*Analysis Date: 10/21/2010*		
Aluminum	10400	12.0	mg/Kg	10270	101	80	120			
Chromium	148	10.0	mg/Kg	139.0	107	80	120			
Zinc	338	10.0	mg/Kg	334.0	101	80	120			
Sample ID: 1010004-001A-MS			*Method: SW6010B*		*Batch ID: 3871*			*Analysis Date: 10/21/2010*		
Aluminum	31500	24.3	mg/Kg-dry	20800	67.8	75	125			S*
Chromium	315	20.3	mg/Kg-dry	281.6	99.1	75	125			
Zinc	786	20.3	mg/Kg-dry	676.5	97.6	75	125			
Sample ID: 1010004-001A-MSD			*Method: SW6010B*		*Batch ID: 3871*			*Analysis Date: 10/21/2010*		
Aluminum	31900	24.3	mg/Kg-dry	20800	69.8	75	125	1.36	20	S*
Chromium	318	20.3	mg/Kg-dry	281.6	100	75	125	1.08	20	
Zinc	803	20.3	mg/Kg-dry	676.5	100	75	125	2.06	20	
Sample ID: 1010004-001A-MST			*Method: SW6010B*		*Batch ID: 3871*			*Analysis Date: 10/21/2010*		
Aluminum	34200	24.3	mg/Kg-dry	20800	80.8	75	125	8.23	20	
Chromium	330	20.3	mg/Kg-dry	281.6	105	75	125	4.74	20	
Zinc	784	20.3	mg/Kg-dry	676.5	97.3	75	125	0.282	20	
Sample ID: 3871-PB-FILTERED			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Arsenic	ND	0.150	mg/Kg							
Cadmium	ND	0.010	mg/Kg							
Copper	ND	0.125	mg/Kg							
Lead	0.008	0.020	mg/Kg							J
Nickel	ND	0.100	mg/Kg							
Selenium	ND	0.200	mg/Kg							
Silver	ND	0.100	mg/Kg							
Sample ID: 3871-PB-UNFILTERED			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Arsenic	ND	0.150	mg/Kg							
Cadmium	ND	0.010	mg/Kg							
Copper	0.072	0.125	mg/Kg							J
Lead	ND	0.020	mg/Kg							
Nickel	0.091	0.100	mg/Kg							J

KW Review

Qualifiers: NA Sample conc. is > 4*spike level

S* Spike Recovery outside limits; within Manufacturer Limits
Manufacturer Limits for Aluminum 4290-15100 mg/kg

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Date: 04-Nov-10
Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058

Work Order: 1010004
BatchID: 3871

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: 3871-PB-UNFILTERED			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Selenium	ND	0.200	mg/Kg							
Silver	ND	0.100	mg/Kg							
Sample ID: 3871-LCS			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Arsenic	281	0.300	mg/Kg	269.0	104	80	120			
Cadmium	306	0.020	mg/Kg	285.0	107	80	120			
Copper	127	0.250	mg/Kg	111.0	115	80	120			
Lead	204	0.040	mg/Kg	190.0	107	80	120			
Nickel	355	0.200	mg/Kg	314.0	113	80	120			
Selenium	142	0.400	mg/Kg	144.0	98.4	80	120			
Silver	70.5	0.200	mg/Kg	62.20	113	80	120			
Sample ID: 1010004-001A-MS			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Arsenic	578	0.608	mg/Kg-dry	544.9	101	75	125			
Cadmium	604	0.041	mg/Kg-dry	577.3	105	75	125			
Copper	396	0.506	mg/Kg-dry	224.8	107	75	125			
Lead	410	0.081	mg/Kg-dry	384.9	102	75	125			
Nickel	716	0.405	mg/Kg-dry	636.0	107	75	125			
Selenium	289	0.810	mg/Kg-dry	291.7	98.8	75	125			
Silver	138	0.405	mg/Kg-dry	126.0	109	75	125			
Sample ID: 1010004-001A-MSD			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Arsenic	600	0.608	mg/Kg-dry	544.9	106	75	125	3.82	20	
Cadmium	619	0.041	mg/Kg-dry	577.3	107	75	125	2.46	20	
Copper	397	0.506	mg/Kg-dry	224.8	108	75	125	0.453	20	
Lead	433	0.081	mg/Kg-dry	384.9	108	75	125	5.30	20	
Nickel	738	0.405	mg/Kg-dry	636.0	111	75	125	3.11	20	
Selenium	297	0.810	mg/Kg-dry	291.7	102	75	125	2.74	20	
Silver	143	0.405	mg/Kg-dry	126.0	113	75	125	3.45	20	
Sample ID: 1010004-001A-MST			*Method: SW6020*		*Batch ID: 3871*			*Analysis Date: 10/26/2010*		
Arsenic	580	0.608	mg/Kg-dry	544.9	102	75	125	0.358	20	
Cadmium	607	0.041	mg/Kg-dry	577.3	105	75	125	0.445	20	
Copper	400	0.506	mg/Kg-dry	224.8	109	75	125	1.17	20	
Lead	415	0.081	mg/Kg-dry	384.9	104	75	125	1.10	20	
Nickel	731	0.405	mg/Kg-dry	636.0	110	75	125	2.06	20	
Selenium	285	0.810	mg/Kg-dry	291.7	97.7	75	125	1.13	20	
Silver	139	0.405	mg/Kg-dry	126.0	110	75	125	1.30	20	

KWS Review

Qualifiers: NA Sample conc. is > 4*spike level S* Spike Recovery outside limits; within Manufacturer Limits

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Date: 04-Nov-10
Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058

Work Order: 1010004
BatchID: 3921

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: ***3921-PB***			*Method:* ***E245.5***		*Batch ID:* ***3921***			*Analysis Date:*	***10/28/2010***	
Mercury	ND	0.100	mg/Kg							
Sample ID: ***1010004-001A-MS***			*Method:* ***E245.5***		*Batch ID:* ***3921***			*Analysis Date:*	***10/28/2010***	
Mercury	57.4	4.65	mg/Kg-dry	49.22	116	51.5	148.6			
Sample ID: ***1010004-001A-MSD***			*Method:* ***E245.5***		*Batch ID:* ***3921***			*Analysis Date:*	***10/28/2010***	
Mercury	53.6	4.67	mg/Kg-dry	49.22	109	51.5	148.6	6.92	20	
Sample ID: ***LCS-3921***			*Method:* ***E245.5***		*Batch ID:* ***3921***			*Analysis Date:*	***10/28/2010***	
Mercury	30.3	2.50	mg/Kg	24.20	125	51.5	148.6			

Review

Qualifiers: NA Sample conc. is > 4*spike level
S* Spike Recovery outside limits; within Manufacturer Limits

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Date: 04-Nov-10
Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058

Work Order: 1010004
BatchID: R14348

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: ***1010004-001A-D***			*Method:* ***MSA15-5***		*Batch ID:* ***R14348***			*Analysis Date:*	***10/18/2010***	
% Clay	16.0	0.1	%					11.8	35	
% Sand	50.0	0.1	%					0	35	
% Silt	34.0	0.1	%					6.06	35	
Soil Class	LOAM		%							

KW Review

Qualifiers: NA Sample conc. is > 4*spike level S* Spike Recovery outside limits; within Manufacturer Limits

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Date: 04-Nov-10
Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058
Work Order: 1010004
BatchID: R14390

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: ***1010004-001AD***			*Method:* ***OM_WALKLE***		*Batch ID:* ***R14390***			*Analysis Date:*	***10/21/2010***	
Organic Matter - Walkl	7.85	0.20	%					0.0497	35	
Sample ID: ***LCS***			*Method:* ***OM_WALKLE***		*Batch ID:* ***R14390***			*Analysis Date:*	***10/21/2010***	
Organic Matter - Walkl	0.62	0.20	%	0.5985	104	70.7	109			
Sample ID: ***A-BLANK***			*Method:* ***OM_WALKLE***		*Batch ID:* ***R14390***			*Analysis Date:*	***10/21/2010***	
Organic Matter - Walkl	ND	0.20	%							

KW Review

Qualifiers: NA Sample conc. is > 4*spike level
S* Spike Recovery outside limits; within Manufacturer Limits

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Date: 04-Nov-10
Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058

Work Order: 1010004
BatchID: R14452

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: ***1010004-001A-D***			*Method:* ***D2216***		*Batch ID:* ***R14452***			*Analysis Date:*	***10/20/2010***	
Percent Moisture	51.0	0.05	wt%					0.702	35	

Review

Qualifiers: NA Sample conc. is > 4*spike level

S* Spike Recovery outside limits; within Manufacturer Limits

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Date: 04-Nov-10
Report Date: 04-Nov-10

QA/QC SUMMARY REPORT

Client: AECOM
Project: PROJECT NO. 60147217-058

Work Order: 1010004
BatchID: R14514

Analyte	Result	RL	Units	Spike Lvl	% Rec	Low Limit	High Limit	RPD	RPD Limit	Qualifier
Sample ID: ***1010004-002A-D***			*Method:* ***AVS-SEM***		*Batch ID:* ***R14514***			*Analysis Date:*	***10/11/2010***	
Sulfide	2.30	1.50	µmoles/g					9.82	35	
Sample ID: ***1010004-002A-S***			*Method:* ***AVS-SEM***		*Batch ID:* ***R14514***			*Analysis Date:*	***10/11/2010***	
Sulfide	16.6	1.50	µmoles/g	17.80	81.4	80	120			
Sample ID: ***LCS WC2343***			*Method:* ***AVS-SEM***		*Batch ID:* ***R14514***			*Analysis Date:*	***10/11/2010***	
Sulfide	12.1	1.50	µmoles/g	12.58	96.2	85	105			
Sample ID: ***PB***			*Method:* ***AVS-SEM***		*Batch ID:* ***R14514***			*Analysis Date:*	***10/11/2010***	
Sulfide	ND	1.50	µmoles/g							

KLD **Review**

Qualifiers: NA Sample conc. is > 4*spike level S* Spike Recovery outside limits; within Manufacturer Limits

AECOM

CHAIN OF CUSTODY RECORD

1010004-

Page ____ of ____

Client/Project Name:

Project Location:

Project Number: 60147217-058

Field Logbook No.:

Sampler (Print Name)/(Affiliation): Liz Elory / D. Pillard / E. Sadler / C. Needham

Chain of Custody Tape Nos.: 42165

Signature:

Send Results/Report to: dave.pillard@aecom.com

TAT: standard

Analysis Requested

Container Type: P – Plastic; A – Amber Glass; G – Clear Glass; V – VOA Vial; O – Other; E – Encore

Preservation: 1 – HCl, 4°; 2 – H2SO4, 4°; 3 – HNO3, 4°; 4 – NaOH, 4°; 5 – NaOH/ZnAc, 4°; 6 – Na2S2O3, 4°; 7 – 4°

Matrix Codes: DW – Drinking Water; WW – Wastewater; GW – Groundwater; SW – Surface Water; ST – Storm Water; W – Water; S – Soil; SL – Sludge; SD – Sediment; SO – Solid; A – Air; L – Liquid; P – Product

Field Sample No./Identification	Date	Time	COMP	GRAB	Sample Container (Size/Mat'l)	Matrix	Preserv.	Field Filtered	TOC (walkley Black)	Al, Cr, Ni, Ag, Zn	As, Cd, Cu, Pb, Se	Mercury	% Coarse material	Rapid hydro. (% clay, silt, sand)	AVS				Lab I.D.	Remarks
23991-johnson creek	9/16/10	1600		X	5 P	S	~~none~~ 7	NA	X	X	X	X	X	X					001	
23992-johnson creek	8/16/10	NA			2-8oz G										X				002	
23993-middle sherman	9/16/10	1600			P				X	X	X	X	X	X					003	
23994-sherman	8/16/10	NA			2-8oz G										X				004	
23995-slate	9/16/10	1600			P				X	X	X	X	X	X					005	
23996-middle slate	unk	NA			1-8oz G										X				006	
23997-lower slate	9/16/10	1600			P				X	X	X	X	X	X					007	
23998-lower slate	8/16/10	NA			1-8oz G										X				008	

Relinquished by: (Print Name)/(Affiliation)	Date	Received by: (Print Name)/(Affiliation)	Date	Analytical Laboratory (Destination):
Kelly Jaye AECOM Signature:	9/29/10 Time: 1400	Signature:	9/30/10 Time: 1100	MSE Lab P.O. box 4078 Butte, MT 59702 ~~AECOM Toxicology Lab~~ ① 4303 W. Laporte Avenue Fort Collins, CO 80521 (970) 416-0916 (970) 490-2963 (FAX)
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:	
Relinquished by: (Print Name)/(Affiliation) Signature:	Date: Time:	Received by: (Print Name)/(Affiliation) Signature:	Date: Time:	Sample Shipped Via: UPS FedEx Courier Other Temp blank: Yes No

① 9/29/10

8.8°C

Q:\GRAPHICS\FORMS\Chain of Custody (COC)\Chain-of-Custody_Ft. Collins_10_07.doc

Serial No. 050855

MSE Lab Services

Sample Receipt Checklist

Client Name AECOM_INC

Date and Time Received: 9/30/2010 11:00:00 AM

Work Order Number 1010004 RcptNo: 1

Received by BO

COC_ID: CoolerID:

Checklist completed by R. O'Donnell 10/1/10 (Signature / Date)

Reviewed by MC 10/1/10 (Initials / Date)

Matrix: Carrier name FedEx

Shipping container/cooler in good condition?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☑	No ☐	Not Present ☐
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☐	No ☑	
Water - VOA vials have zero headspace?	No VOA vials submitted ☑	Yes ☐	No ☐
Water - pH acceptable upon receipt?	Yes ☐	No ☐	Blank ☐

Adjusted? No-SED Checked by BO 10/1/10

Any No and/or NA (not applicable) response must be detailed in the comments section be

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding: _____

Comments: TEMP = NA SEDIMENT

Corrective Action _____

APPENDIX 2: BENTHIC INVERTEBRATE DATA

Appendix 2: Benthic Invertebrates collected in 2010.
Slate Creek

Order	Family	Genus	1	2	3	4	5	6
Ephemeroptera	Baetidae	Baetis	23	3	46	46	24	7
	Heptageniidae	Epeorus	2	6	16	0	4	1
		Cinygmula	53	41	40	6	12	2
		Rithrogena	0	0	3	0	0	0
	Ephemerellidae	Attenella						
		Drunella	0	0	4	0	0	0
		Caudatella						
	Leptophlebiidae	Paraleptophlebia	10	2	3	0	0	0
Plecoptera	Chloroperlidae	Alaskaperla	42	7	8	0	5	0
		Haploperla						
		Suwallia	0	0	1	0	0	0
		Kathroperla						
		Plumiperla						
		Neaviperla						
		Utaperla						
		Alloperla						
	Capniidae	Paracapnia						
	Nemouridae	Nemoura	8	4	22	58	12	2
		Zapada	1	2	4	0	0	1
	Perlidae	Agnetina	4	2	5	0	1	
	Perlodidae	Salmoperla	0	0	0	0	0	1
		Megarcys						
	Leuctridae	Perlomyia	3	0	0	0	0	0
		Despaxia						
Trichoptera	Brachycentridae	Micrasema						
	Hydropsychidae	Parapsyche						
		Arctopsyche						
	Glossosomatidae	Glossoma						
		Anagapetus						
	Polycentropidae	Cernotina	0	0	0	0	1	0
		Paranyctiophylax						
	Rhyacophilidae	Rhyacophila	3	0	3	1	1	0
	Phryganiidae	Hagenalla						
		Yphria						
	Limnephelidae	Moselyana	0	0	0	1	0	0
Diptera								
Chironomidae	Orthocladiinae	Eukiefferiella	17	0	39	2	13	15
		Tvetenia						
		Parachaetocladius						
	Diamesinae	Pagastia						
	Tanytarsini	Tanytarsus	113	8	20	0	12	0
		Stempellinella						
Nematocera	Tipulidae	Dicranota	13	1	3	0	0	0
		Tipula	3	1		0	1	0
Brachycera	Ceratopogonidae	Probezzia	9	0	2	0	1	0
	Empididae	Clinocera						
Collembola	Entomobryidae	Tomocerus	0	0	0	0	0	1
Coloeptera		Unidentified	0	0	1	0	0	0
Oligochaetae	Tubificidae		0	0	2	0	1	0
Simuliidae	Simuliidae	Prosimulium	14	7	40	6	0	1
Hydrachnidae	Eylaidae	Eylais						
	Hydrodromidae	Hydrodroma						
Sphaeriidae	Psidiinae	Psidium (pea clam)	220	60	104	6	65	0
		Total	**538**	**144**	**366**	**126**	**153**	**31**

Johnson Creek

Order	Family	Genus	1	2	3	4	5	6
Ephemeroptera	Baetidae	Baetis	183	345	117	171	118	140
		Diphetor	0	0	7	5	0	0
	Heptageniidae	Epeorus	1	3	8	1		4
		Cinygmula	44	92	98	84	74	17
		Rithrogena	4	2	1	4	6	10
	Ephemerellidae	Attenella						
		Drunella	19	61	49	11	41	11
		Caudatella	5	22		1	1	4
	Leptophlebiidae	Paraleptophlebia	1	0	0	1	0	1
Plecoptera	Chloroperlidae	Triznaka	0	0	0	5	0	0
		Haploperla						
		Suwallia						
		Kathroperla						
		Plumiperla	1	5	2	1	9	2
		Alaskaperla						
		Neaviperla						
	Leuctridae	Despaxia	2	5	3	0	0	1
		Perlomyia	1	0	0	0	4	0
	Perlidae	Hesperoperla						
		Hansonperla						
		Neoperla						
		Claassenia						
	Nemouridae	Zapada	22	30	5	34	1	3
		Nemoura	0	0	0	0	1	0
		Shipsa	2	0	0	0	1	2
		Prostoia						
	Capniidae	Paracapnia	0	0	0	0	1	0
		Allocapnia						
		Eucanopsis						
	Perlodidae	Megarcys						
Trichoptera	Brachycentridae	Micrasema						
	Hydropsychidae	Parapsyche	1	2	0	0	0	6
		Arctopsyche						2
	Glossosomatidae	Glossoma	12	43	27	27	2	7
		Agapetus						
		Anangapetus						
	Polycentropidae	Neureclipses						
		Paranyctiophylax						
		Cyrnellus						
		Polyplectropus						
	Rhyacophilidae	Rhyacophila	13	34	5	5	2	10
		Himalopsyche						
	Psychomiidae	Lype						
	Phryganeidae	Yphria						
	Limnephilidae	Grensia	0	0	0	2	0	0
		Moselyana	0	0	1	3	0	0
	Brachycentridae	Amniocentrus						
Diptera	Chironomidae							
sub-family	Orthocladiinae	Eukiefferiella A	31	90	23	91	6	13
		Tvetenia	15	11	1	20	1	3
		Corynoneura						
		Parachaetocladius	1		3	1	0	1
	Diamesinae	Pagasta	4	9	14	5		3
	Tanytarsini	Tanytarsus	4	8	81	53	7	10
	Tanypodinae	Telmatopelopia						
Nematocera	Tipulidae	Dicranota	1	6	5	6	1	0
		Tipula						
		Antocha						
	Empididae	Clinocera						
Brachycera	Ceratopogonidae	Probezzia						
		Limnochares						
	Sciomyzidae	Hedria						
	Simuliidae	Prosimulium	2	3	0	0	0	0
Oligochaetae			3	0	30	1	0	2
Collembola		Folsomina						
Mites		Hydrachna	0	1	0	0	0	0
		Total	**372**	**771**	**480**	**532**	**276**	**252**

Sherman Reach 1 samples.

Order	Family	Genus	1	2	3	4	5	6
Ephemeroptera	Baetidae	Baetis	125	158	309	106	120	224
		Diphetor						
	Heptageniidae	Epeorus	5	10	12	10	4	5
		Cinygmula	2	10	15	6	8	14
		Rithrogena	0	0	1	0	0	0
	Ephemerellidae	Caudatella	1	1	0	2	0	1
		Drunella	1	6	3	4	6	12
		Attenella						
	Leptophlebiidae	Leptophlebia						
		Paraleptophlebia						
	Ameletidae	Ameletus						
Plecoptera	Chloroperlidae	Alaskaperla	0	1	0	2	1	2
		Haploperla						
		Suwallia						
		Kathroperla						
		Plumiperla	3	3	5	10	12	7
		Neaviperla						
		Utaperla						
		Alloperla						
	Capniidae	Allocapnia						
		Paracapnia	3	4	0	0	1	1
	Perlidae	Hesperoperla						
		Hansonperla						
		Agnetina						
		Doroneuria						
		Neoperla						
	Leuctricidae	Perlomyia	0	0	0	0	1	0
	Nemouridae	Zapada	4	8	6	3	0	3
		Nemoura	0	0	0	0	0	1
		Shipsa	0	2	2	12	0	0
	Perlodidae	Megarcys	0	0	1	0	0	7
Trichoptera	Brachycentridae	Micrasema						
	Hydropsychidae	Parapsyche						
		Arctopsyche						
	Glossosomatidae	Glossoma	0	0	0	1	0	0
		Agapetus						
	Polycentropidae	Neureclipses						
		Paranyctiophylax						
	Rhyacophilidae	Rhyacophila	0	1	1	0	0	1
		Himalopsyche						
	Psychomiidae	Lype						
	Phryganeidae	Haganella						
		Yphria						
	Limnephilidae	Moselyana						
		Grensia	0	0	0	1	0	1
		Ecclisomyia	0	0	0	0	1	0
Diptera								
Chironomidae	Orthocladiinae	Eukiefferiella	12	14	31	26	5	22
		Tvetania	0	0	4	0	2	2
	Podominae	Paraboreochlus	0	1	0	2	0	0
		Corynoneura						
	Diamesinae	Pagastia	0	0	0	1	0	0
	Tanytarsini	Tanytarsus	0	2	1	4	0	0
	Tanypodinae	Telmatopelopia						
Nematocera	Tipulidae	Dicranota	2	3	1	3	4	9
		Hesperoconopa	1	0	0	0	0	0
		Hexatoma	0	1	0	3	0	0
	Empididae	Clinocera	3	2	3	7	8	1
		Oreogeton	0	0	0	0	0	1
Brachycera	Ceratopogonidae	Dasyhelea						
	Syrphidae	unknown						
	Dryomyziidae	unknown						
Simuliidae	Simuliidae	Prosimulium						
	Oligochaetae		24	45	94	87	5	67
Collembola	Onychiuridae	Lophognathella						
	Sminthuridae	Dicyrtoma						
Coleoptera	Haliplidae	Haliplus						
Lepidoptera	Pyralidae	Crambus						
		Total	**186**	**272**	**489**	**290**	**178**	**381**

Sherman Reach 2 samples

Order	Family	Genus	1	2	3	4	5	6
Ephemeroptera	Baetidae	Baetis	121	109	196	145	166	154
		Diphetor						
	Heptageniidae	Epeorus	6	5	15	6	3	3
		Cinygmula	7	1	6	6	2	7
		Rithrogena	0	1	1	1	0	0
	Ephemerellidae	Caudatella	2					1
		Drunella	3	5	11	5	6	5
		Attenella						
	Leptophlebiidae	Leptophlebia						
		Paraleptophlebia	0	0	0	0	1	0
	Ameletidae	Ameletus						
Plecoptera	Chloroperlidae	Alaskaperla	1	2	0	0	4	0
		Haploperla						
		Suwallia						
		Kathroperla						
		Plumiperla	7	4	7	13	0	10
		Neaviperla						
		Utaperla						
		Alloperla						
	Capniidae	Allocapnia						
		Paracapnia	0	0	0	0	1	0
	Perlidae	Hesperoperla						
		Hansonperla						
		Agnetina						
		Doroneuria						
		Neoperla						
	Leuctricidae	Despaxia	0	0	0	0	0	1
		Perlomyia	0	0	0	1	0	0
	Nemouridae	Zapada	0	1	8	6	3	13
		Nemoura						
		Shipsa	0	0	0	1	0	1
	Perlodidae	Megarcys	0	3	1	0	0	3
Trichoptera	Brachycentridae	Micrasema						
	Hydropsychidae	Parapsyche						
		Arctopsyche						
	Glossosomatidae	Glossoma	0	0	1	0	0	1
		Agapetus						
	Polycentropidae	Neureclipses						
		Paranyctiophylax						
	Rhyacophilidae	Rhyacophila	2	1	7	0	7	3
		Himalopsyche						
	Psychomiidae	Lype						
	Phryganeidae	Haganella						
		Yphria						
	Limnephilidae	Moselyana	0	0	1	0	0	0
		Grensia	0	0	0	0	0	3
		Ecclisomyia						
Diptera								
Chironomidae	Orthocladiinae	Eukiefferiella	15	10	47	10	22	15
		Tvetania	1	0	7	0	4	0
		Parachaetocladius						
		Corynoneura						
	Diamesinae	Pagastia	0	0	0	0	1	0
	Tanytarsini	Tanytarsus	0	0	0	0	2	0
	Tanypodinae	Telmatopelopia						
Nematocera	Tipulidae	Dicranota	4	2	6	0	6	2
		Brachypremna	0	0	0	0	1	0
		Hexatoma	3	0			1	0
	Empididae	Clinocera	0	2	6	2	6	0
		Oreogeton	0	1	0	0	0	0
Brachycera	Ceratopogonidae	Dasyhelea						
	Syrphidae	unknown						
	Dryomyziidae	unknown						
Simuliidae	Simuliidae	Prosimulium						
	Oligochaetae		0	1	3	7	3	3
Collembola		Tomocerus	1	0	0	0	0	0
	Sminthuridae	Dicyrtoma						
Coleoptera	Haliplidae	Haliplus						
Lepidoptera	Pyralidae	Crambus						
		Total	**173**	**148**	**323**	**203**	**239**	**225**

Sweeny Reach 1

Order	Family	Genus	1	2	3	4	5	6
Ephemeroptera	Baetidae	Baetis	68	22	112	17	28	22
		Diphetor	0	1	0	0	0	0
	Heptageniidae	Epeorus	3	0	0	2	0	0
		Cinygmula	2	2	0	2	3	5
		Rithrogena	2	2	5	3	4	2
	Ephemerellidae	Drunella						
		Caudatella	0	0	2	0	0	0
	Leptophlebiidae	Paraleptophlebia						
Plecoptera	Chloroperlidae	Alaskaperla	0	0	0	1	0	0
		Haploperla						
		Kathroperla						
		Plumiperla	5	7	2	17	4	0
		Suwallia						
	Capniidae	Paracapnia	6	3	1	3	0	1
	Leuctridae	Despaxia	4	1	0	1	1	0
	Perlidae	Hesperoperla						
	Nemouridae	Zapada						
		Nemoura	1	0	2	0	0	0
	Perlodidae	Megarcys						
Trichoptera	Hydropsychidae	Parapsyche	0	0	1	0	0	0
		Arctopsyche						
	Glossosomatidae	Glossoma						
		Agapetus						
	Polycentropidae	Neureclipses						
		Paranyctiophylax						
	Rhyacophilidae	Rhyacophila	0	1	2	0	0	0
	Limnephilidae	Rossiana						
Diptera								
Chironomidae	Orthocladiinae	Eukiefferiella	19	47	31	2	25	2
		Tvetania	4	1	0	0	0	0
		Corynoneura						
	Podominae	Paraboreochlus						
	Tanytarsini	Tanytarsus	0	0	0	0	1	0
	Tipulidae	Dicranota	1	0	4	1	1	1
		Hexatoma						
		Antocha	1	0	0	0	1	0
Brachycera	Empididae	Clinocera	0	0	0	1	0	0
	Simuliidae	Prosimulium						
	Oligochaetae		3	2	0	2	4	3
Collembola	Entomobryidae	Tomocerus	1	0	0	0	0	0
Hydrachnidae		Hydrachna	0	1	0	0	0	0
		Total	**120**	**90**	**162**	**52**	**72**	**36**

Sweeny Reach 2

Order	Family	Genus	1	2	3	4	5	6
Ephemeroptera	Baetidae	Baetis	21	26	21	22	43	38
		Diphetor						
	Heptageniidae	Epeorus	0	0	1	0	5	0
		Cinygmula	4	7	4	6		2
		Rithrogena	2	1	0	6	6	2
	Ephemerellidae	Drunella						
		Caudatella						
	Leptophlebiidae	Paraleptophlebia	0	1	0	0	0	0
Plecoptera	Chloroperlidae	Alaskaperla						
		Haploperla	0	1	0	0	0	2
		Kathroperla						
		Plumiperla	9	9	5	11	17	11
		Suwallia						
	Capniidae	Paracapnia	0	2	1	4	2	6
	Leuctridae	Despaxia	3	2	1	11	3	0
	Perlidae	Hesperoperla						
	Nemouridae	Zapada						
		Nemoura	0	0	2	0	0	0
	Perlodidae	Megarcys						
Trichoptera	Hydropsychidae	Parapsyche						
		Arctopsyche						
	Glossosomatidae	Glossoma						
		Agapetus						
	Polycentropidae	Neureclipses						
		Paranyctiophylax						
	Rhyacophilidae	Rhyacophila						
	Limnephilidae	Rossiana						
Diptera								
Chironomidae	Orthocladiinae	Eukiefferiella	21	2	6	17	2	0
		Tvetania						
		Corynoneura						
	Podominae	Paraboreochlus	0	0	0	1	0	0
	Tanytarsini	Tanytarsus	0	0	2	0	1	0
	Tipulidae	Dicranota	2	1	0	0	0	0
		Hexatoma	0	0	0	0	0	1
		Antocha						
Brachycera	Empididae	Clinocera						
	Simuliidae	Prosimulium						
	Oligochaetae		0	1	0	1	1	0
Collembola	Entomobryidae	Tomocerus	1	0	0	0	0	0
Hydrachnidae		Hydrachna	1	0	0	0	0	0
		Total	**64**	**53**	**43**	**79**	**80**	**62**

APPENDIX 3A: ADFG FISH RESOURCE PERMIT
(SF2010-209, Resident Fish Survey)

STATE OF ALASKA
DEPARTMENT OF FISH AND GAME

P.O. BOX 115525
JUNEAU, ALASKA 99811-5525

Permit #: **SF2010-209**

Expires: **9/30/2010**

Collections Report Due: **10/30/2010**

FISH RESOURCE PERMIT
(For Scientific/Educational Purposes)

This permit authorizes Liz Flory *(whose signature is required on page 2 for permit validation)*
person

of Aquatic Sciences, Inc. *agency or organization* **at** 4546 River Road, Juneau, AK 99801 *address*

to conduct the following activities **from** July 1, 2010 **to** September 30, 2010 in accordance with AS 16.05.930:

Purpose: To monitor fish populations by species, habitat type and strata as well as measure fish condition factor as required by the Environmental Protection Agency's NPDES permit.

Location: Sherman/Slate/Johnson Creeks in the Berner's Bay area

Species Collected: Dolly Varden, cutthroat trout

Method of Capture: Minnow trap, backpack electrofisher **(Stipulation #7)**

Final Disposition: ≤250 Dolly Varden and ≤60 cutthroat trout may be captured, measured and released alive at the capture site.
Unintended mortalities must be recorded/reported with carcasses returned to the capture site

-Continued on Back-

REPORT DUE October 30, 2010. The report shall include species, numbers, dates, and locations of collection (datum/GPS coordinates in the decimal degrees format (dd.ddddd)) and disposition, and if applicable, sex, age, and breeding condition, and lengths and weights of fish. *It must also include the date/time the local biologist was contacted for final authorization to carry out collecting activities.* A completion report (abstract, background, methods, data, analysis), if not submitted with the collection report described above, must be submitted to the department by: ***March/2011***. Data from such reports are considered public information. The report shall also include other information as may be required under the permit stipulations section.

GENERAL CONDITIONS, EXCEPTIONS AND RESTRICTIONS

1. This permit must be carried by person(s) specified during approved activities who shall show it on request to persons authorized to enforce Alaska's fish and game laws. This permit is nontransferable and will be revoked or renewal denied by the Commissioner of Fish and Game if the permittee violates any of its conditions, exceptions or restrictions. No redelegation of authority may be allowed under this permit unless specifically noted.
2. No specimens taken under authority hereof may be sold or bartered. All specimens must be deposited in a public museum or a public scientific or educational institution unless otherwise stated herein. Subpermittees shall not retain possession of live animals or other specimens.
3. The permittee shall keep records of all activities conducted under authority of this permit, available for inspection at all reasonable hours upon request of any authorized state enforcement officer.
4. Permits will not be renewed until the department has received detailed reports, as specified above.
5. UNLESS SPECIFICALLY STATED HEREIN, THIS PERMIT DOES NOT AUTHORIZE the exportation of specimens or the taking of specimens in areas otherwise closed to hunting and fishing; without appropriate licenses required by state regulations; during closed seasons; or in any manner, by any means, at any time not permitted by those regulations.

Bob Pawlowski	[illegible signature]	4/23/10
Fish Resource Permit Coordinator Division of Sport Fish	Director Division of Sport Fish	Date

Authorized Personnel: The following persons may perform collecting activities under terms of this permit:

John Burke, Elizabeth Flory, Charmagne Gutierrez, Gordon Wilson

Employees and volunteers under the direct supervision of, and in the presence of, one of the authorized personnel listed above may participate in collecting activities under terms of this permit.

Permit Stipulations:

1) The local Area Management Biologist (AMB), **Brian Glynn** (465-4318; brian.glynn@alaska.gov) Juneau, must be notified **prior** to you engaging in any collecting activities. *The time/date of this contact must be included in your collections report (using the "data submission form" furnished by ADF&G).* This biologist has the right to specify methods for collecting, as well as limiting the collections of any species by number, time and location.
2) All unattended sampling gear must be; 1) labeled with the permittee's name, telephone number, and permit number, 2) securely tied to substrate, 3) allowed to soak no more than twenty-four hours at a time, 4) located with GPS coordinates, and 5) accounted for/ removed at the conclusion of sampling.
3) Because the use of Aqui-S as a fish sedative is specifically prohibited by the FDA and MS-222 is prohibited from being used on any fish that may be eaten by humans for 21 days after treatment, the Division of Sport Fish position is that food grade clove oil, purchasable at grocery stores, is the most logical choice with the least concern for liability as a fish anesthesia for tagging and telemetry studies.
4) Salmon eggs used as bait in traps must either be; sterilized commercial eggs or, if raw, be disinfected prior to use. A 10-minute soak in 1/100 Betadyne solution or some other iodophor disinfectant is adequate.
5) Gloves (cotton, etc.), boots, and collecting gear should be disinfected between streams to reduce the potential of pathogen transmission. A wash/rinse in 1/100 Betadyne solution is adequate.
6) If anadromous fish species new to permitted streams and rivers are found, the permit holder will work closely with ADF&G to see that information is included in the database for the *Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes*. Anadromous fish include *Oncorhynchus spp.*, Arctic char, Dolly Varden, sheefish, smelts, lamprey, whitefish, and sturgeon. Please direct questions to J. Johnson, 267-2337 or j.johnson@alaska.gov
7) Electroshocking is currently discouraged, but not prohibited by the department. Electroshockers may not be used in anadromous waters in the presence of adult salmonids, adult trout or adult char. In areas where other means of capture are not feasible, only one pass is allowed. All electroshocked fish should be monitored before release. Mortalities or injuries must be reported on the collections report. Operators of electroshockers must have formal training.
8) Atlantic salmon and other non-native invasive aquatic species encountered should be killed. Contact the nearest AMB **(Stipulation #1)** immediately with species identification or description, capture or sighting location, number captured, size, and sex. Preserve/turn in the whole specimen to the nearest ADF&G office.
9) *A copy of this permit, including any amendments, must be made available at all field collection sites and project sites for inspection upon request by a representative of the department or a law enforcement officer.*
10) Issuance of this permit does not absolve the permittee from compliance in full with any and all other applicable federal, state, or local laws, regulations, or ordinances.
11) A report of collecting activities, referenced to this fish resource permit number, must be submitted to the Alaska Department of Fish and Game, Division of Sport Fish HQ, P.O. Box 115525, Juneau, AK 99811-5525, Attention: Bob Piorkowski (465-6109; Robert.Piorkowski@alaska.gov), and to the AMB **(Stipulation #1)** within 30 days after the expiration of this permit. This report must summarize the number of fish captured by date, by location (provide GPS coordinates and datum), and by species, and the fate of those fish. Fish length, weight, sex, and age data should be included if collected. A completion report (abstract/background/methods /data/analysis), if not submitted with the collection report described above, must be submitted to the department within six months of the expiration of the permit. Data from such reports are considered public information. A report is required whether or not collecting activities were undertaken.

PERMIT VALIDATION requires permittee's signature agreeing to abide by permit conditions before beginning collecting activities:

_____

Signature of Permittee

cc: Brian Glynn, Division of Sport Fish, Juneau
Kevin Monagle, Division of Commercial Fisheries, Juneau
Jackie Timothy, Division of Habitat, Juneau
Fish and Wildlife Protection, Juneau

APPENDIX 3B: FISH HABITAT DIMENSIONS

Appendix 3b: Dimensions of each habitat unit.

2010 Resident Fish Habitat Summary						
Stream Reach	**Habitat Variable**	**Pool**	**Riffle**	**Glide**	**Cascade**	**All Units**
Lower Johnson	Number of Units	**27**	**16**	**9**	**0**	**52**
	Total Length (m)	94.3	206.2	76.7	0.0	377
	Mean Length (m)	3.5	12.9	8.5	-	7.3
	Mean Width (m)	4.3	2.9	3.2	0.0	3.5
	Mean Area (m^2)	13.2	58.0	31.8	-	30.2
	Total Area (m^2)	**355.8**	**928.1**	**286.5**	**0**	**1570.4**
	% of Total Area	22.7	59.1	18.2	0.0	100.0
	Habitat Variable	**Pool**	**Riffle**	**Glide**	**Cascade**	**All Units**
Middle Johnson	Number of Units	**42**	**13**	**1**	**7**	**63**
	Total Length (m)	126.4	192.2	5.9	97.3	462.2
	Mean Length (m)	3.0	14.8	-	13.9	7.3
	Mean Width (m)	6.3	2.8	-	5.8	5.0
	Mean Area (m^2)	11.3	92.2	-	69.9	34.8
	Total Area (m^2)	**476.4**	**1198.7**	**29.5**	**489.6**	**2194.2**
	% of Total Area	21.7	54.6	0.0	22.3	100.0
	Habitat Variable	**Pool**	**Riffle**	**Glide**	**Cascade**	**All Units**
Upper Johnson	Number of Units	**22**	**15**	**6**	**4**	**66**
	Total Length (m)	140.4	169.0	39.7	26.4	375.5
	Mean Length (m)	6.4	11.3	6.6	6.6	5.7
	Mean Width (m)	4.2	3.8	3.0	3.3	3.6
	Mean Area (m^2)	74.8	37.2	16.1	26.6	36.5
	Total Area (m^2)	**1645.9**	**558.5**	**96.3**	**106.5**	**2407.1**
	% of Total Area	68.4	23.2	4.0	4.4	100.0
Stream Reach	**Habitat Variable**	**Pool**	**Riffle**	**Glide**	**Cascade**	**All Units**
Lower Sherman	Number of Units	**33**	**12**	**1**	**6**	**52**
	Total Length (m)	79.4	227.6	1.0	100.5	408.5
	Mean Length (m)	2.4	19.0	1.0	16.8	7.9
	Mean Width (m)	6.5	3.4	3.0	6.0	4.3
	Mean Area (m^2)	16.7	106.8	3.0	83.0	44.9
	Total Area (m^2)	**552.6**	**1281.6**	**3.0**	**498**	**2334.8**
	% of Total Area	23.7	54.9	0.1	21.3	100.0
	Habitat Variable	**Pool**	**Riffle**	**Glide**	**Cascade**	**All Units**
Middle Sherman	Number of Units	**58**	**17**	**1**	**18**	**117**
	Total Length (m)	142.4	141.8	7.2	165.6	457.0
	Mean Length (m)	2.5	8.3	-	9.2	3.9
	Mean Width (m)	6.0	2.3	-	2.5	3.7
	Mean Area (m^2)	7.0	41.1	-	44.4	16.6
	Total Area (m^2)	**403.3**	**698.9**	**36.0**	**798.8**	**1936.9**
	% of Total Area	20.8	36.1	0.0	41.2	100.0
	Habitat Variable	**Pool**	**Riffle**	**Glide**	**Cascade**	**All Units**
Upper Sherman	Number of Units	**62**	**27**	**6**	**20**	**88**
	Total Length (m)	138.9	131.6	28.5	130.0	429.0
	Mean Length (m)	2.2	4.9	4.8	6.5	4.9
	Mean Width (m)	2.6	1.6	2.7	2.6	1.9
	Mean Area (m^2)	5.3	16.9	13.7	22.9	15.0
	Total Area (m^2)	**327.6**	**456.2**	**82.4**	**457.3**	**1323.4**
	% of Total Area	24.8	34.5	6.2	34.6	100.0

Appendix 3b cont.

Stream Reach	Habitat Variable	Pool	Riffle	Glide	Cascade	All Units
Lower Slate	Number of Units	**19**	**14**	**14**	**0**	**80**
	Total Length (m)	69.8	169.0	124.2	0.0	407.3
	Mean Length (m)	3.7	12.1	8.9	-	5.1
	Mean Width (m)	3.8	2.5	4.5	-	3.3
	Mean Area (m^2)	11.8	50.1	39.5	-	18.5
	Total Area (m^2)	**223.7**	**700.8**	**552.5**	**6**	**1483.0**
	% of Total Area	15.1	47.3	37.3	0.4	100.0
	Habitat Variable	**Pool**	**Riffle**	Glide	Cascade	All Units
Middle Slate	Number of Units	**21**	**19**	**9**	**10**	**78**
	Total Length (m)	57.0	410.7	414.7	70.9	344.8
	Mean Length (m)	2.7	21.6	46.1	7.1	4.4
	Mean Width (m)	3.9	2.7	3.7	3.3	3.4
	Mean Area (m^2)	9.4	88.8	176.6	20.7	47.2
	Total Area (m^2)	**196.5**	**1687.5**	**1589.3**	**207.0**	**3680.2**
	% of Total Area	5.3	45.9	43.2	5.6	100.0
	Habitat Variable	**Pool**	**Riffle**	**Glide**	**Cascade**	**All Units**
Upper Slate	Number of Units	**33**	**46**	**8**	**0**	**118**
	Total Length (m)	67.8	259.8	42.9	0.0	370.5
	Mean Length (m)	2.1	5.6	5.4	0.0	3.1
	Mean Width (m)	1.9	1.7	2.2	-	1.9
	Mean Area (m^2)	4.0	12.0	9.8	-	6.5
	Total Area (m^2)	**133.0**	**551.7**	**78.1**	**0**	**762.7**
	% of Total Area	17.4	72.3	10.2	0.0	100.0

APPENDIX 3C: RESIDENT FISH SURVEY DATA

Appendix 3c: Resident fish survey data – fish counts per habitat unit.

Lower Johnson

					Snorkel		Fish	
Habitat Type	Distance (m)	Length (m)	Width (m)	Area (m²)	Dv	Ct	Dv	Ct
Riffle	9.8	1.3	4.5	5.85	0	0		
Pool		8.5	8.0	68.00	15	1	9	1
Riffle	22.8	14.3	3.0	42.90	0	0	0	0
Glide	32.9	10.1	4.5	45.45	0	1	0	1
Riffle	36.7	3.8	2.5	9.50	0	0	0	0
Side Pool		2.0	2.0	4.00	3	0	3	0
Pool	43.6	6.9	3.0	20.70	0	0		
Riffle	51.8	8.2	3.0	24.60	NS	NS		
Pool	58.0	6.2	3.0	18.60	9	0		
Riffle	62.6	4.6	3.5	16.10	0	0		
Glide	65.8	3.2	2.0	6.40	0	0	0	0
Pool	68.7	2.9	6.0	17.40	10	0		
Side Pool		1.0	2.0	2.00	3	0	3	0
Riffle	89.9	21.2	3.5	74.20	3	0	3	0
Riffle	98.8	8.9	3.0	26.70	NS	NS		
Side Pool		3.0	3.0	9.00	0	0		
Glide	104.4	5.6	2.5	14.00	0	0	0	0
Pool	107.1	2.7	2.0	5.40	4	0	4	0
Riffle	125.0	17.9	3.5	62.65	0	0	0	0
Glide	134.3	9.3	4.5	41.85	1	0	1	0
Riffle	144.5	10.2	5.0	51.00	0	0	0	0
Glide	157.5	13.0	6.0	78.00	1	0	1	0
Pool	166.3	8.8	5.0	44.00	10	0		
Riffle	166.9	0.6	7	4.20	3	0		
Side Pool		2.0	2.0	4.00	1	0		
Glide	170.8	3.9	4.5	17.55	3	0		
Side Pool		4.0	2.0	8.00	4	0	4	0
Pool	175.0	4.2	4.0	16.80	42	0		
Riffle	192.1	17.1	7.5	128.25	0	0		
Pool	202.5	5.0	2.0	10.00	9	0		
Glide	218.8	16.3	3.5	57.05	0	0		
Side Pool		2.5	4.5	11.25	8	0		
Side Pool		2.0	3.0	6.00	5	0		
Glide	221.9	3.1	4.5	13.95	NS	NS		
Pool	225.8	3.9	6.0	23.40	17	0		
Side Pool			2.0	0.00	9	0		
Glide	238.0	12.2	1.0	12.20	NS	NS		
Side Pool		1.0	2.0	2.00	NS	NS		
Side Pool		3.0	2.0	6.00	2	0		
Riffle	246.0	8.0	4.0	32.00	NS	NS		
Side Pool		2.0	2.0	4.00	NS	NS		
Side Pool		1.0	2.0	2.00	NS	NS		
Pool	253.7	1.5	1.5	2.25	5	0		
Riffle	266.8	13.1	6.5	85.15	NS	NS		
Side Pool		2.0	2.0	4.00	NS	NS		
Pool	275.0	8.2	5.0	41.00	24	0		
Riffle	295.0	20.0	4.5	90.00	NS	NS		
Side Pool		2.0	2.0	4.00	NS	NS		
Pool	300.0	5.0	2.0	10.00	4	0		
Riffle	320.0	20.0	4.5	90.00	0	0		
Pool	323.0	3.0	4.0	12.00	25	0		
Riffle	360.0	37.0	5.0	185.00	NS	NS		

Lower Sherman

					Snorkel		Fish	
Habitat Type	Distance (m)	Length (m)	Width (m)	Area (m²)	Dv	Ct	Dv	Ct
Riffle	39.8	38.8	8.0	310.40	2	1	3	1
side pool		1.0	1.0	1.00	0	0		
side pool		1.0	2.0	2.00	0	0		
Pool	53.4	13.6	8.0	108.80	5	0		
Pool	59.6	6.2	4.0	24.80	0	0		
Riffle	69.5	9.9	3.5	34.65	NS			
side pool		2.0	2.0	4.00	0	0		
Riffle	83.0	13.5	8.0	108.00	0	1	0	1
Riffle	104.4	21.4	7.0	149.80	3	1	0	1
side pool		2.0	2.0	4.00	1	0	1	0
side pool		2.0	3.0	6.00	2	1	2	1
Riffle	127.5	23.1	3.0	69.30		0		0
side pool		1.0	2.0	2.00	0	1	0	1
side pool		1.0	2.0	2.00	0	0	0	0
Glide		1.0	3.0	3.00	0	0	0	0
Riffle	134.0	6.5	3.0	19.50	1	0	1	0
Riffle	142.4	8.4	5.0	42.00	1	0	1	0
Casade	148.8	6.4	5.0	32.00	NS			
Pool	158.5	9.7	5.5	53.35	2	1	2	1
Riffle	169.0	10.5	6.0	63.00	0	0		
side pool		1.0	2.0	2.00	1	0	1	0
side pool		1.0	2.0	2.00	NS			
side pool		1.0	2.0	2.00	0	0	0	0
Casade	179.2	10.2	6.0	61.20	NS			
side pool		1.0	2.0	2.00	0	0		
Riffle	209.0	29.8	4.0	119.20	1	0	1	0
side pool		2.0	8.0	16.00	0	0		
Casade	218.3	9.3	6.0	55.80	NS			
side pool		3.0	2.0	6.00	NS			
Riffle	233.0	14.7	6.0	88.20	NS			
side pool		1.0	3.0	3.00	NS			
side pool		3.0	3.0	9.00	0	0		
side pool		2.0	2.0	4.00	NS			
side pool		3.0	2.0	6.00	1	0		
Casade	235.0	2.0	4.0	8.00	NS			
side pool		1.0	2.5	2.50	1	0		
side pool		2.0	3.0	6.00	NS			
side pool		3.0	4.0	12.00	3	0		
side pool		1.0	2.0	2.00	1	0		
side pool		1.0	2.0	2.00	NS			
Riffle	284.0	49.0	5.5	269.50	1	2		
Casade	349.6	65.6	4.5	295.20	NS			
side pool		1.5	2.0	3.00	1	0		
side pool		2.0	1.0	2.00		2		
Riffle		2.0	4.0	8.00	1	0		
side pool		2.0	3.0	6.00	NS			
side pool		1.0	2.0	2.00	0	0		
side pool		2.0	2.0	4.00	1	0		
side pool		2.0	2.0	4.00	1	0		
Pool	353.0	3.4	6.5	22.10	5	1		
Casade	360.0	7.0	6.5	45.50	NS			
Pool		15.0	15.0	225.00	10	2		

Lower Slate

						Snorkel		Fish	
Habitat Type	Distance (ft)	Distance (m)	Length (m)	Width (m)	Area (m²)	Dv	Ct	Dv	Ct
Pool	78.5	23.9		3.5		33	6		
Riffle	98.6	30.1	6.1	3.5	21.46	2	2	2	2
Side Pool		0.0	1.0	2.0	2.00	0	1		
Glide	136.9	41.8	11.7	4.5	52.57	4	3	4	3
Riffle	180.9	55.2	13.4	5.5	73.81	NS	ns		
Side Pool		0.0	1.0	1.0	1.00	0	0		
Glide		0.0	2.0	5.0	10.00	4	0	4	0
Glide		0.0	2.0	4.0	8.00	0	1	0	1
Glide	261.4	79.7	24.6	8.0	196.42	2	2	2	2
Side Pool		0.0	5.0	3.0	15.00	2	1		
Riffle	379.9	115.9	36.1	6.0	216.86	0	0	0	0
Side Pool		0.0	1.0	1.0	1.00	0	1		
Side Pool		0.0	1.0	1.0	1.00	1	0		
Side Pool		0.0	1.0	1.0	1.00	NS	ns		
Riffle	408.2	124.5	8.6	3.5	30.21	1	0	1	0
Glide	450.4	137.4	12.9	3.5	45.05	NS	ns		
Pool	484.1	147.7	10.3	8.0	82.23	3	3		
Riffle	508.1	155.0	7.3	3.0	21.96	0	0	0	0
Glide	540.7	164.9	9.9	3.0	29.83	3	2	2	2
Glide	565.6	172.5	7.6	3.0	22.78	NS	ns		
Riffle	596.0	181.8	9.3	3.5	32.45	NS	ns		
Glide	605.4	184.6	2.9	2.5	7.17	0	0		
Pool	623.5	190.2	5.5	2.5	13.80	0	0		
Riffle	648.9	197.9	7.7	3.0	23.24	0	0	0	0
Pool	671.0	204.7	6.7	2.0	13.48	0	2		
Riffle	679.1	207.1	2.5	2.5	6.18	0	0	0	0
Pool	698.0	212.9	5.8	4.0	23.06	0	5		
Riffle	712.8	217.4	4.5	9.5	42.88	NS	ns		
Glide	732.8	223.5	6.1	4.5	27.45	NS	ns		
Pool	756.2	230.6	7.1	6.0	42.82	4	5		
Riffle	801.7	244.5	13.9	4.0	55.51	0	0		
Side Pool		0.0	1.0	1.0	1.00	NS	ns		
Side Pool		0.0	4.0	3.0	12.00	NS	ns		
Pool	814.5	248.4	3.9	3.0	11.71	1	2	1	2
Riffle	818.7	249.7	1.3	2.0	2.56	0	0		
Glide	848.0	258.6	8.9	3.0	26.81	0	0		
Side Pool		0.0	1.0	4.0	4.00	4	4	3	4
Glide	894.3	272.8	14.1	3.0	42.36	NS	ns		
Side Pool		0.0	2.0	3.0	6.00	2	1	3	1
Glide	932.7	284.5	11.7	3.0	35.14	0	3		
Glide	955.2	291.3	6.9	4.5	30.88	0	0		
Side Pool		0.0	2.0	3.0	6.00	2	2	2	2
Riffle	983.1	299.8	8.5	4.5	38.29	0	0		
Glide		0.0	3.0	6.0	18.00	0	4		
Riffle	1019.7	311.0	11.2	3.5	39.07	NS	ns		
Pool	1054.0	321.5	10.5	3.5	36.62	4	4	4	4
Riffle		360.0	38.5	2.5	96.33	ns	ns		

Middle Slate

Habitat Type	Distance (m)	Length (m)	Width (m)	Area (m²)	Snorkel Dv	Fish Dv
Riffle	2.9	0.9	4.0	3.60	0	
Pool		2.0	2.0	4.00	0	
Pool		5.0	5.0	25.00	0	
Cascade	9.8	6.9	4.0	27.60	NS	
Riffle	16.0	6.2	4.0	24.80	1	
Pool		1.0	1.0	1.00	NS	
Glide	27.4	11.4	4.0	45.60	0	
Pool	30.1	2.7	3.0	8.10	2	2
Cascade	39.5	9.4	3.5	32.90	0	
Pool		1.0	1.0	1.00	0	0
Riffle	44.5	5.0	3.5	17.50	0	
Riffle	52.8	8.3	2.5	20.75	NS	
Riffle	61.0	8.2	2.5	20.50	0	
Glide	64.2	3.2	2.5	8.00	NS	
Pool		1.0	1.0	1.00	0	0
Cascade	68.5	4.3	2.0	8.60	NS	
Pool		1.0	1.0	1.00	NS	
Riffle	74.3	5.8	3.0	17.40	0	
Pool	77.3	3.0	3.0	9.00	3	3
Riffle	86.4	9.1	4.0	36.40	NS	
Glide	93.2	6.8	4.0	27.20	1	2
Riffle	100.9	7.7	3.5	26.95	1	1
Pool		1.0	1.0	1.00	1	1
Riffle	110.6	9.7	4.0	38.80	0	0
Pool		1.0	1.0	1.00	NS	
Riffle	117.4	6.8	4.0	27.20	0	0
Cascade	119.9	2.5	4.0	10.00	NS	
Riffle	127.5	7.6	3.0	22.80	0	0
Pool		2.0	2.0	4.00	0	0
Cascade	131.2	3.7	2.0	7.40	NS	
Riffle	133.2	2.0	2.0	4.00	NS	
Pool		2.0	2.0	4.00	0	
Pool	137.2	4.0	3.0	12.00	2	3
Glide	148.4	11.2	3.0	33.60	0	
Pool	151.4	3.0	3.0	9.00	1	1
Cascade	156.9	5.5	1.0	5.50	NS	
Pool		1.0	1.0	1.00	0	
Cascade	162.8	5.9	4.5	26.55	NS	
Pool		1.0	1.0	1.00	NS	
Pool		1.0	1.0	1.00	0	
Riffle	168.8	6.0	3.0	18.00	1	1
Riffle	175.8	7.0	3.0	21.00	1	1
Cascade	183.3	7.5	5.5	41.25	NS	
Riffle	192.8	9.5	5.5	52.25	0	0
Pool		1.0	2.0	2.00	NS	
Pool		1.0	2.0	2.00	1	
Pool	199.0	6.2	4.5	27.90	0	
Glide	203.0	203.0	4.5	913.50	1	1
Riffle	219.2	219.2	5.0	1096.00	NS	
Glide	222.2	23.2	2.0	46.40	1	1
Riffle	231.4	28.4	2.0	56.80	1	1
Cascade	233.4	14.2	1.0	14.20	NS	
Pool	238.3	16.1	5.0	80.50	4	
Cascade	242.4	11.0	3.0	33.00	NS	
Glide	246.5	13.1	2.5	32.75	NS	
Riffle	234.7	-3.6	5.0	-18.00	2	
Glide	296.2	53.8	4.0	215.20	1	2
Riffle	313.4	66.9	3.0	200.70	NS	
Glide	323.7	89.0	3.0	267.00	NS	

Upper Slate

Habitat Type	Distance (m)	Length (m)	Width (m)	Area (m²)	Snorkel Dv	Fish Dv
Riffle	4.2		2.0		0	
Riffle	9.5	5.3	2.0	10.60	NS	
Pool		0.5	0.5	0.25	0	
Riffle	22.3	12.8	2.0	25.60	NS	
Pool		1.0	2.0	2.00	2	3
Glide	25.6	3.3	3.0	9.90	2	2
Pool	30.4	4.8	2.0	9.60	1	1
Glide	41.2	10.8	1.0	10.80	1	1
Riffle	44.0	2.8	0.5	1.40	NS	
Glide	51.5	7.5	2.5	18.75	0	
Pool		1.0	2.0	2.00	2	2
Pool		1.0	2.0	2.00	1	1
Pool		1.0	1.0	1.00	NS	
Riffle	58.5	7.0	1.0	7.00	0	
Pool	59.1	0.6	1.5	0.90	1	1
Riffle	66.1	7.0	2.0	14.00	NS	
Pool	70.0	3.9	2.0	7.80	0	
Riffle	73.5	3.5	1.5	5.25	0	
Pool		0.5	0.5	0.25	1	1
Glide	77.5	4.0	1.5	6.00	NS	
Pool	79.6	2.1	1.5	3.15	2	2
Riffle	81.0	1.4	1.5	2.10	0	
Riffle	87.6	6.6	2.0	13.20	NS	
Pool	90.7	3.1	2.0	6.20	1	2
Riffle	96.6	5.9	1.0	5.90	NS	
Riffle	106.1	9.5	2.0	19.00	0	
Pool		0.5	1.0	0.50	1	2
Pool		1.0	0.5	0.50	NS	
Riffle	114.7	8.6	2.0	17.20	NS	
Pool	118.4	3.7	2.0	7.40	0	
Riffle	123.1	4.7	2.0	9.40	NS	
Riffle	129.1	6.0	2.0	12.00	0	0
Pool	131.1	2.0	2.5	5.00	NS	
Riffle	135.8	4.7	2.0	9.40	NS	
Pool		1.0	3.0	3.00	2	3
Riffle	138.6	2.8	2.0	5.60	0	0
Pool	140.5	1.9	2.5	4.75	0	
Glide	145.4	4.9	2.0	9.80	1	2
Riffle	147.7	2.3	2.5	5.75	NS	
Glide	151.7	4.0	2.0	8.00	1	2
Riffle	158.8	7.1	2.5	17.75	NS	
Riffle	160.5	1.7	2.0	3.40	0	0
Pool	163.7	3.2	2.0	6.40	1	
Riffle	164.0	0.3	2.0	0.60	NS	
Glide	168.5	4.5	2.0	9.00	NS	
Pool		1.0	2.0	2.00	1	
Riffle	179.9	11.4	3.0	34.20	NS	
Pool	182.8	2.9	3.0	8.70	2	
Riffle	186.1	3.3	3.0	9.90	NS	
Pool		2.0	2.0	4.00	0	
Riffle	189.7	3.6	3.0	10.80	0	0
Pool	191.4	1.7	2.0	3.40	2	2

Upper Slate cont.

Habitat Type	Distance (m)	Length (m)	Width (m)	Area (m²)	Snorkel Dv	Fish Dv
Riffle	193.5	2.1	3.0	6.30	0	0
Pool	196.3	2.8	1.0	2.80	2	2
Riffle	199.7	3.4	3.0	10.20	NS	
Pool	202.5	2.8	2.5	7.00	2	
Riffle	210.9	8.4	2.0	16.80	NS	
Pool		1.0	2.0	2.00	0	
Pool	214.8	3.9	2.0	7.80	1	
Riffle	220.4	5.6	2.0	11.20	0	0
Riffle	225.6	5.2	2.5	13.00	NS	
Pool	227.6	2.0	2.0	4.00	1	
Riffle	229.2	1.6	2.0	3.20	1	1
Riffle	234.5	5.3	2.0	10.60	NS	
Riffle	238.1	3.6	2.0	7.20	1	1
Riffle	247.9	9.8	2.5	24.50	NS	
Pool	249.2	1.0	1.0	1.00	NS	
Riffle	253.7	4.5	2.5	11.25	NS	
Pool	255.9	2.2	1.0	2.20	2	
Riffle	259.7	3.8	2.5	9.50	NS	
Pool	263.7	4.0	2.0	8.00	1	
Riffle	267.8	4.1	3.5	14.35	0	
Riffle	293.8	26.0	3.0	78.00	NS	
Riffle	297.4	3.6	2.0	7.20	0	
Riffle	301.3	3.9	2.0	7.80	NS	
Glide	305.2	3.9	1.5	5.85	1	
Riffle	307.5	2.3	2.0	4.60	NS	
Riffle	309.9	2.4	2.0	4.80	0	
Riffle	312.7	2.8	2.0	5.60	NS	
Riffle	320.3	7.6	0.5	3.80	0	
Riffle	324.2	3.9	3.0	11.70	NS	
Pool		0.5	0.5	0.25	0	
Pool	328.4	4.2	3.0	12.60	1	
Riffle	331.8	3.4	2.0	6.80	NS	
Riffle	333.6	1.8	2.0	3.60	0	
Riffle	360.0	26.4	1.5	39.60	NS	
Pool		3.0	1.5	4.50	1	

Middle Johnson

Habitat Type	Distance (m)	Length (m)	Width (m)	Area (m²)	Snorkel Dv	Fish Dv
Riffle	11.7	9.7	6.5	63.05	0	0
Pool		2.0	1.0	2.00	NS	
Riffle	26.4	14.7	4.0	58.80	NS	
Pool		2.0	1.0	2.00	0	
Riffle	73.1	46.7	7.0	326.90	1	1
Pool		2.0	1.0	2.00	NS	
Pool		2.0	3.0	6.00	1	
Pool		2.0	1.0	2.00	0	
Riffle	96.2	23.1	5.0	115.50	0	0
Pool		2.0	1.0	2.00	0	
Pool		2.0	1.0	2.00	0	
Pool		1.0	1.0	1.00	0	
Pool		4.0	3.5	14.00	2	
Pool		2.0	1.0	2.00	0	
Pool		4.0	2.0	8.00	1	
Riffle	112.3	16.1	6.0	96.60	NS	
Pool		4.0	2.0	8.00	1	
Pool		2.0	1.5	3.00	0	
Pool		2.0	1.0	2.00	3	3
Pool	140.5	28.2	8.0	225.60	55	
Cascade	158.1	17.6	7.0	123.20	NS	
Pool		2.0	1.0	2.00	0	
Pool		2.0	1.0	2.00	0	
Pool		1.0	1.0	1.00	0	
Pool		2.0	1.0	2.00	0	
Riffle	175.7	17.6	6.5	114.40	0	0
Pool		1.0	2.0	2.00	1	
Pool		1.0	2.0	2.00	0	
Pool		1.0	2.0	2.00	0	
Pool	180.5	4.8	4.0	19.20	6	6
Pool		2.0	3.0	6.00	6	6
Cascade	192.2	11.7	4.0	46.80	NS	
Riffle	207.0	14.8	6.0	88.80	NS	
Pool	215.4	8.4	4.5	37.80	9	9
Cascade	220.0	4.6	4.5	20.70	NS	
Pool		2.0	2.0	4.00	2	2
Pool		1.0	2.0	2.00	0	0
Riffle	225.8	5.8	4.0	23.20	1	1
Pool		1.0	3.0	3.00	1	1
Cascade	232.1	6.3	5.0	31.50	NS	
Pool		2.0	2.0	4.00	NS	
Riffle	234.7	2.6	5.0	13.00	0	
Pool		1.0	2.0	2.00	2	2
Pool		1.0	2.0	2.00	NS	
Pool		1.0	2.0	2.00	2	2
Riffle	253.2	18.5	4.0	74.00	NS	
Pool		3.0	2.0	6.00	1	
Cascade	268.0	14.8	4.0	59.20	NS	
Pool		2.0	2.0	4.00	NS	
Pool		2.0	2.0	4.00	1	
Pool		2.5	2.0	5.00	2	2
Pool	274.9	6.9	6.0	41.40	6	6
Riffle	290.6	15.7	6.0	94.20	0	
Glide	296.5	5.9	5.0	29.50	11	12
Cascade	322.5	26.0	5.5	143.00	NS	
Pool		2.0	1.0	2.00	NS	
Pool		2.0	1.5	3.00	0	
Pool		4.0	3.0	12.00	2	
Pool		2.0	2.0	4.00	NS	
Riffle	332.7	10.2	9.0	91.80	NS	
Riffle	339.1	6.4	6.0	38.40	2	
Pool	343.7	4.6	4.0	18.40	11	
Cascade	360.0	16.3	4.0	65.20	NS	

Upper Johnson

Habitat Type	Distance (m)	Length (m)	Width (m)	Area (m²)	Snorkel Dv	Fish Dv
Pool	7.0		2.0		1	1
Riffle	9.5	2.5	2.0	5.00	0	0
Riffle	15.2	5.7	2.0	11.40	NS	
Pool	18.5	3.3	2.0	6.60	0	
Pool		1.0	1.0	1.00	NS	
Glide	29.0	10.5	2.0	21.00	0	0
Pool		3.0	2.0	6.00	0	
Glide	35.9	6.9	2.0	13.80	NS	
Pool		2.0	1.0	2.00	NS	
Glide	40.4	4.5	2.0	9.00	0	0
Pool	51.4	11.0	2.0	22.00	0	
Riffle	62.3	10.9	2.0	21.80	NS	
Pool		1.0	1.0	1.00	NS	
Pool	112.1	49.8	20.0	996.00	24	
Pool	136.5	24.4	20.0	488.00	60	
Pool	140.5	4.0	4.0	16.00	2	2
Glide	142.3	1.8	2.5	4.50	0	0
Pool		2.0	3.0	6.00	1	1
Pool		2.0	3.0	6.00	3	3
Pool	158.8	16.5	3.0	49.50	10	11
Riffle	160.8	2.0	4.0	8.00	0	0
Pool	164.0	3.2	3.0	9.60	6	5
Riffle	188.2	24.2	3.5	84.70	0	0
Riffle	207.0	18.8	3.5	65.80	NS	
Pool		1.0	1.0	1.00	0	0
Pool		1.0	1.0	1.00	0	
Riffle	224.0	17.0	4.0	68.00	1	1
Riffle	240.4	16.4	4.0	65.60	NS	
Cascade	252.7	12.3	3.5	43.05	NS	
Pool		3.0	1.0	3.00	0	
Riffle	257.3	4.6	3.0	13.80	NS	
Glide	266.0	8.7	3.0	26.10	0	0
Cascade	271.8	5.8	6.5	37.70	NS	
Pool		1.5	1.5	2.25	NS	
Pool		2.0	3.0	6.00	0	
Riffle	275.7	3.9	6.5	25.35	NS	
Cascade	279.0	3.3	4.0	13.20	NS	
Pool	284.7	5.7	3.0	17.10	4	4
Cascade	289.7	5.0	2.5	12.50	NS	
Riffle	310.2	20.5	3.0	61.50	NS	
Pool		1.0	1.8	1.80	NS	
Riffle	318.1	7.9	3.0	23.70	0	0
Riffle	326.1	8.0	3.0	24.00	NS	
Riffle	328.8	2.7	3.0	8.10	0	
Glide	336.1	7.3	3.0	21.90	0	
Pool		2.0	2.0	4.00	3	3
Riffle	360.0	23.9	3.0	71.70	0	

Middle Sherman

Habitat Type	Distance (m)	Length (m)	Width (m)	Area (m²)	Dv	Dv
Casacade	6.2	3.2	7.0	22.40	NS	
Pool		3.0	2.0	6.00	0	
Pool	7.8	1.6	7.0	11.20	1	
Casacade	10.3	2.5	4.0	10.00	NS	
Pool	11.1	0.8	5.0	4.00	0	
Pool		1.0	3.0	3.00	2	
Pool		1.0	1.0	1.00	NS	
Casacade	16.8	5.7	3.0	17.10	NS	
Pool		1.0	3.0	3.00	0	
Pool		4.0	3.0	12.00	1	
Riffle	32.1	15.3	6.0	91.80	0	
Pool		1.0	1.0	1.00	NS	
Casacade	53.0	20.9	3.0	62.70	NS	
Pool		3.0	3.0	9.00	0	
Pool		2.0	4.0	8.00	2	
Pool		2.0	3.0	6.00	2	
Pool		3.0	3.0	9.00	0	
Casacade	59.8	6.8	4.0	27.20	0	
Pool		4.0	3.0	12.00	0	
Pool		5.0	3.0	15.00	0	
Pool		2.0	2.0	4.00	0	
Pool		1.0	2.0	2.00	1	
Casacade	71.4	11.6	3.0	34.80	NS	
Pool		2.0	2.0	4.00	1	
Pool		2.0	3.0	6.00	0	
Pool		2.0	3.0	6.00	NS	
Casacade	84.3	12.9	8.5	109.65	NS	
Pool		2.0	2.0	4.00	NS	
Pool		2.0	2.0	4.00	NS	
Pool		1.0	2.0	2.00	NS	
Pool		1.0	2.0	2.00	0	
Riffle	95.0	10.7	5.0	53.50	1	
Pool		1.0	2.0	2.00	0	
Pool		1.0	2.0	2.00	2	2
Casacade	102.3	7.3	6.0	43.80	0	
Riffle	108.1	5.8	5.0	29.00	0	
Pool		4.0	4.0	16.00	4	4
Casacade	121.4	13.3	6.5	86.45	NS	
Pool		1.0	2.0	2.00	1	1
Pool		2.5	2.0	5.00	1	1
Pool		1.0	2.0	2.00	NS	
Pool		3.0	2.0	6.00	1	1
Pool		1.0	3.0	3.00	1	1
Pool		3.0	2.0	6.00	1	2
Riffle	136.2	14.8	6.0	88.80	0	0
Casacade	148.5	12.3	6.0	73.80	NS	
Pool		4.0	5.0	20.00	6	
Riffle	154.7	6.2	4.5	27.90	0	0
Riffle	160.2	5.5	4.5	24.75	0	0
Pool		1.0	2.0	2.00	1	1
Casacade	163.7	3.5	3.0	10.50	NS	
Riffle	167.7	4.0	5.5	22.00	1	1

Middle Sherman cont.

Habitat Type	Distance (m)	Length (m)	Width (m)	Area (m²)	Snorkel Dv	Fish Dv
Riffle	170.7	3.0	5.0	15.00	1	1
Pool		2.0	2.0	4.00	1	1
Casacade	182.9	12.2	4.0	48.80	0	
Pool		1.0	1.0	1.00	0	0
Riffle	192.5	9.6	5.0	48.00	1	1
Casacade	194.9	2.4	7.5	18.00	NS	
Riffle	200.0	5.1	7.5	38.25	0	
Riffle	207.5	7.5	7.5	56.25	0	
Pool		2.0	5.0	10.00	1	1
Riffle	211.4	3.9	3.0	11.70	1	
Pool		2.0	2.0	4.00	1	1
Pool		2.0	1.0	2.00	1	1
Riffle	218.0	6.6	5.0	33.00	0	
Pool		2.0	2.0	4.00	1	1
Pool		2.0	2.0	4.00	NS	
Casacade	233.9	15.9	6.5	103.35	0	
Pool	236.1	2.2	5.0	11.00	1	1
Glide	243.3	7.2	5.0	36.00	0	0
Riffle	248.7	5.4	4.0	21.60	NS	
Pool		3.0	1.0	3.00	3	
Pool		2.0	2.0	4.00	0	0
Riffle	262.0	13.3	3.0	39.90	NS	
Pool		2.0	1.0	2.00	1	1
Pool		2.0	1.0	2.00	0	
Pool		2.0	2.5	5.00	3	
Casacade	270.3	8.3	6.0	49.80	0	
Pool	274.3	4.0	3.5	14.00	1	
Casacade	277.3	3.0	3.0	9.00	NS	
Pool		3.0	3.0	9.00	1	
Pool		1.0	2.0	2.00	0	
Pool	296.9	19.6	3.0	58.80	1	
Casacade	309.6	12.7	3.0	38.10	0	
Pool		2.0	2.0	4.00	NS	
Riffle	331.7	22.1	4.0	88.40	NS	
Pool	338.9	7.2	5.0	36.00	1	
Casacade	350.0	11.1	3.0	33.30	NS	
Pool		2.0	2.0	4.00	NS	
Pool		1.0	2.0	2.00	NS	
Riffle	353.0	3.0	3.0	9.00	0	
Pool		3.0	3.0	9.00	0	
Pool		1.0	2.0	2.00	1	
Pool		2.5	2.5	6.25	2	

Upper Sherman

Habitat Type	Distance (ft)	Length (m)	Width (m)	Area (m²)	Snorkel Dv	Fish Dv
Riffle	4.5	1.5	4.0	6.00	0	
Pool		3.0	1.0	3.00	1	
Cascade	6.9	2.4	2.0	4.80	NS	
Pool		2.0	1.0	2.00	1	
Riffle	8.3	1.4	3.5	4.90	0	
Pool	10.9	2.6	3.5	9.10	0	
Riffle	20.1	9.2	4.0	36.80	0	
Pool		1.0	1.0	1.00	0	
Pool		1.0	1.0	1.00	0	
Riffle	21.7	1.6	3.5	5.60	0	
Pool		2.0	1.0	2.00	1	
Riffle	26.6	4.9	3.5	17.15	NS	
Pool	29.9	3.3	2.0	6.60	1	
Riffle	38.3	8.4	2.0	16.80	0	
Pool		2.0	1.0	2.00	1	
Pool		3.0	1.0	3.00	1	
Riffle	39.6	1.3	4.5	5.85	0	
Pool	43.7	4.1	2.0	8.20	1	
Riffle	45.0	1.3	1.0	1.30	NS	
Riffle	50.2	5.2	3.0	15.60	NS	
Pool	53.2	3.0	4.0	12.00	1	
Cascade	54.6	1.4	3.0	4.20	NS	
Riffle	60.9	6.3	4.0	25.20	NS	
Pool		1.0	1.0	1.00	NS	
Pool	65.2	4.3	2.5	10.75	1	1
Riffle	67.1	1.9	4.0	7.60	0	0
Pool		2.0	2.0	4.00	NS	
Pool	69.6	2.5	3.5	8.75	2	2
Riffle	85.3	15.7	3.5	54.95	1	
Pool	86.3	1.0	3.5	3.50	5	5
Pool	86.7	0.4	2.5	1.00	2	2
Riffle	88.0	1.3	2.5	3.25	NS	
Glide	94.5	6.5	2.0	13.00	1	1
Cascade	97.8	3.3	2.0	6.60	NS	
Riffle	108.8	11.0	4.0	44.00	0	0
Pool		1.0	1.0	1.00	0	
Glide		1.0	3.0	3.00	2	2
Pool		2.0	1.0	2.00	0	
Pool		2.0	1.0	2.00	1	1
Pool		1.5	1.0	1.50	0	0
Glide	111.0	2.2	2.5	5.50	NS	
Pool	115.9	4.9	3.0	14.70	1	1
Cascade	130.6	14.7	3.5	51.45	NS	
Pool		2.0	1.0	2.00	1	1
Pool		2.0	1.0	2.00	NS	
Pool		2.0	2.0	4.00	0	
Pool		1.0	1.0	1.00	0	
Riffle	134.3	3.7	3.5	12.95	1	1
Pool		1.5	2.0	3.00	0	
Pool		1.0	1.0	1.00	0	
Riffle	138.3	4.0	3.5	14.00	0	
Pool	140.0	1.7	3.0	5.10	3	3
Cascade	144.4	4.4	3.5	15.40	NS	
Glide	153.3	8.9	3.5	31.15	3	3
Cascade	159.6	6.3	3.5	22.05	NS	

Upper Sherman cont.

Habitat Type	Distance (ft)	Length (m)	Width (m)	Area (m²)	Snorkel Dv	Fish Dv
Pool		2.0	2.0	4.00	NS	
Pool	162.7	3.1	3.0	9.30	2	2
Cascade	165.7	3.0	3.0	9.00	NS	
Pool		2.0	2.0	4.00	1	1
Pool		2.0	3.0	6.00	1	1
Riffle	170.1	4.4	3.0	13.20	0	0
Pool	172.6	2.5	4.0	10.00	1	1
Cascade	175.3	2.7	4.5	12.15	NS	
Pool	181.2	5.9	3.0	17.70	2	2
Pool		1.0	1.0	1.00	0	
Riffle	187.1	5.9	3.5	20.65	0	
Pool		1.5	2.0	3.00	2	3
Pool		2.0	1.0	2.00	0	
Pool	189.9	2.8	3.5	9.80	1	
Cascade	191.9	2.0	1.5	3.00	NS	
Pool	193.8	1.9	2.0	3.80	1	
Cascade	194.8	1.0	3.0	3.00	NS	
Riffle	196.6	1.8	3.0	5.40	0	
Pool		2.0	1.5	3.00	1	
Riffle	200.2	3.6	3.0	10.80	0	
Glide	206.0	5.8	3.0	17.40	1	1
Riffle	208.9	2.9	3.0	8.70	0	
Cascade	218.4	9.5	3.0	28.50	NS	
Pool		2.0	3.0	6.00	0	
Pool		1.0	1.0	1.00	NS	
Pool	222.2	3.8	6.0	22.80	20	
Cascade	239.4	17.2	4.5	77.40	NS	
Pool		1.0	1.0	1.00	NS	
Pool		1.0	1.0	1.00	0	
Riffle	253.1	13.7	4.5	61.65	1	1
Pool		1.5	2.0	3.00	0	
Cascade	258.8	5.7	4.0	22.80	NS	
Pool		2.0	2.0	4.00	NS	
Riffle	265.0	6.2	3.0	18.60	NS	
Glide	269.1	4.1	3.0	12.30	5	
Cascade	284.2	15.1	3.5	52.85	NS	
Pool		2.0	1.0	2.00	0	
Pool		2.0	2.0	4.00	2	
Pool		3.0	2.0	6.00	NS	
Pool	290.4	6.2	5.0	31.00	4	
Riffle	296.6	6.2	3.0	18.60	1	
Pool		2.0	1.0	2.00	0	
Cascade	298.4	1.8	2.0	3.60	NS	
Pool	300.4	2.0	2.5	5.00	2	
Cascade	301.3	0.9	1.0	0.90	NS	
Pool	302.3	1.0	2.0	2.00	2	
Cascade	307.8	5.5	2.5	13.75	NS	
Riffle	311.1	3.3	3.5	11.55	NS	
Riffle	313.2	2.1	2.5	5.25	2	
Pool	314.3	1.1	3.0	3.30	3	
Cascade	323.9	9.6	4.0	38.40	NS	
Pool		2.0	2.0	4.00	1	
Riffle	326.7	2.8	3.5	9.80	2	
Pool	332.2	5.5	2.5	13.75	3	
Cascade	344.4	12.2	3.0	36.60	NS	
Pool		2.0	2.0	4.00	NS	
Pool		1.0	1.0	1.00	NS	
Pool		3.0	2.0	6.00	NS	
Pool	348.7	4.3	3.0	12.90	2	
Cascade	360.0	11.3	4.5	50.85	NS	

APPENDIX 3D: FISH LENGTH & WEIGHT DATA

Appendix 3d: Total length, weight and condition factor (K) for resident fish in 2010

Lower Johnson		7/22/10						
Dolly Varden	**Notes:**							
Location	Length (mm)	Weight (g)	L power 3	W/L³	k			
Trap 1	186	41.9	6434856	6.5114E-06	0.651	mean		0.746
	80	4.4	512000	8.5938E-06	0.859	ST dev		0.082
Trap 3	175	36.5	5359375	6.8105E-06	0.681	n		18
	115	12.4	1520875	8.1532E-06	0.815	95% CI		0.0379
Trap 4	113	11.6	1442897	8.0394E-06	0.804			
	113	10.0	1442897	6.9305E-06	0.693			
Trap 6	81	4.5	531441	8.4675E-06	0.847			
	122	12.2	1815848	6.7186E-06	0.672			
	85	5.2	614125	8.4673E-06	0.847			
	92	6.5	778688	8.3474E-06	0.835			
	133	15.2	2352637	6.4608E-06	0.646			
All dollys	93	6.2	804357	7.708E-06	0.771			
	206	68.6	8741816	7.8473E-06	0.785			
	111	10.8	1367631	7.8969E-06	0.790			
	120	10.5	1728000	6.0764E-06	0.608			
	126	12.9	2000376	6.4488E-06	0.645			
	116	11.6	1560896	7.4316E-06	0.743			
	115	11.2	1520875	7.3642E-06	0.736			

Lower Sherman									
7/25/10		**Notes:**							
Location	Species	Length (mm)	Weight (g)	L power 3	W/L³	k			
0-50 m	Cutthroat	127	19.1	2048383	9E-06	0.932	mean		0.919
Missed 1	Dolly	130	23.0	2197000	1E-05	1.047	ST dev		0.112
	Dolly	172	41.4	5088448	8E-06	0.814	n		15
	Dolly	100	10.1	1000000	1E-05	1.010	95% CI		0.057
	Dolly	102	9.7	1061208	9E-06	0.914			
	Dolly	80	4.6	512000	9E-06	0.898			
130m	Dolly	143	26.8	2924207	9E-06	0.916			
	Dolly	91	7.2	753571	1E-05	0.955			
170m	Dolly	202	69.0	8242408	8E-06	0.837			
	Dolly	126	15.7	2000376	8E-06	0.785			
230m	Dolly	92	6.8	778688	9E-06	0.873			
240m	Dolly	71	4.3	357911	1E-05	1.201			
250-300m	Dolly	180	57	5832000	1E-05	0.977			
	Dolly	206	75.4	8741816	9E-06	0.863			
	Dolly	80	3.9	512000	8E-06	0.762			

Lower Slate										
8/2/10			**Notes:**							
Location	Species		Length (mm)	Weight (g)	L power 3	W/L³	k			
100m trap	Dolly		160	28.3	4096000	7E-06	0.691	mean		0.805
many more	Dolly		190	59.5	6859000	9E-06	0.867	ST dev		0.148
dollys outside	Dolly		162	26.9	4251528	6E-06	0.633	n		11
	Dolly		150	24.3	3375000	7E-06	0.720	95% CI		0.088
	Dolly		150	23.5	3375000	7E-06	0.696			
	Dolly		179	45.0	5735339	8E-06	0.785			
	Cutthroat		137	20.8	2571353	8E-06	0.809			
270m trap	Cutthroat		106	9.4	1191016	8E-06	0.789			
300m trap	Cutthroat		115	12.7	1520875	8E-06	0.835			
gage trap	Cutthroat		86	7.6	636056	1E-05	1.195			
	Dolly		170	41	4913000	8E-06	0.835			

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Middle Slate	8/11/10	Notes:							
Location	Species	Length (mm)	Weight (g)	L power 3	W/L^3	k			
pool 20m 4 fish	Dolly	103	9.1	1092727	8E-06	0.833	mean		0.854
pool 50m 1 fish		86	5.5	636056	9E-06	0.865	ST dev		0.084
pool 60m 1 fish		119	14.1	1685159	8E-06	0.837	n		25
		97	7.7	912673	8E-06	0.844	95% CI		0.033
		86	5.3	636056	8E-06	0.833			
		84	4.9	592704	8E-06	0.827			
pool 80m 3 fish		91	7.0	753571	9E-06	0.929			
pool 90m 1 fish		101	8.5	1030301	8E-06	0.825			
pool 110m 1		86	6.1	636056	1E-05	0.959			
2 in riffle		91	6.7	753571	9E-06	0.889			
pool 140m		95	7	857375	8E-06	0.816			
2 missed		187	36.5	6539203	6E-06	0.558			
		87	6.3	658503	1E-05	0.957			
2 fish 190m		86	5.1	636056	8E-06	0.802			
pool 210m		89	6.6	704969	9E-06	0.936			
		77	4.2	456533	9E-06	0.92			
		89	5.4	704969	8E-06	0.766			
		92	6.6	778688	8E-06	0.848			
		87	6	658503	9E-06	0.911			
		100	8.4	1000000	8E-06	0.84			
		84	5.2	592704	9E-06	0.877			
		86.0	5.4	636056	8E-06	0.849			
		104.0	8.6	1124864	8E-06	0.765			
		75.0	3.7	421875	9E-06	0.877			
		80.0	5.0	512000	1E-05	0.977			
Upper Slate		**Notes:**							
Location	Species	Length (mm)	Weight (g)	L power 3	W/L^3	k			
25-50m	Dolly	86	4.8	636056	8E-06	0.755	mean		0.849
	Dolly	92	5.8	778688	7E-06	0.745	ST dev		0.11
also 10 fry	Dolly	63	2.2	250047	9E-06	0.880	n		35
missed 2	Dolly	70	2.6	343000	8E-06	0.758	95% CI		0.037
	Dolly	70	2.6	343000	8E-06	0.758			
	Dolly	68	2.6	314432	8E-06	0.827			
	Dolly	66	2.5	287496	9E-06	0.870			
	Dolly	150	27.8	3375000	8E-06	0.824			
	Dolly	67	2.6	300763	9E-06	0.864			
	Dolly	91	5.4	753571	7E-06	0.717			
	Dolly	91	5.8	753571	8E-06	0.77			
	Dolly	60	1.8	216000	8E-06	0.833			
	Dolly	70	3.1	343000	9E-06	0.904			
	Dolly	61	1.9	226981	8E-06	0.837			
	Dolly	71	2.7	357911	8E-06	0.754			
	Dolly	62	2.1	238328	9E-06	0.881			
	Dolly	67	2.7	300763	9E-06	0.898			
	Dolly	36	0.3	46656	6E-06	0.643			
75-175m	Dolly	124	16.1	1906624	8E-06	0.844			
2 missed	Dolly	107	9.8	1225043	8E-06	0.8			
	Dolly	85	5.7	614125	9E-06	0.928			
3 in 1 pool	Dolly	77.0	4.6	456533	1E-05	1.008			
2 in pool	Dolly	72.0	3.0	373248	8E-06	0.804			
last pool 1	Dolly	76.0	3.8	438976	9E-06	0.866			
	Dolly	74.0	3.8	405224	9E-06	0.938			
	Dolly	70.0	4.1	343000	1E-05	1.195			
	Dolly	65.0	2.1	274625	8E-06	0.765			
	Dolly	102.0	10.2	1061208	1E-05	0.961			
	Dolly	120.0	13.9	1728000	8E-06	0.804			
	Dolly	101.0	8.4	1030301	8E-06	0.815			
	Dolly	83.0	6.6	571787	1E-05	1.154			
	Dolly	72.0	3.0	373248	8E-06	0.804			
	Dolly	64.0	2.4	262144	9E-06	0.916			
	Dolly	76.0	3.5	438976	8E-06	0.797			
	Dolly	70.0	2.7	343000	8E-06	0.787			

Middle Johnson		All Dolly Varden						
Location	Length (mm)	Weight (g)	L power 3	W/L^3	k			
140m pool	123	14.4	1860867	7.7383E-06	0.774	mean		0.806
	175	41.8	5359375	7.7994E-06	0.780	ST dev		0.0588
	136	19.3	2515456	7.6726E-06	0.767	n		51
	127	16.0	2048383	7.811E-06	0.781	95% CI		0.0161
	147	25.3	3176523	7.9647E-06	0.796			
	138	20.1	2628072	7.6482E-06	0.765			
	157	28.8	3869893	7.4421E-06	0.744			
	135	18.2	2460375	7.3972E-06	0.740			
	97	7.2	912673	7.8889E-06	0.789			
	147	26.8	3176523	8.4369E-06	0.844			
	132	18.0	2299968	7.8262E-06	0.783			
	150	25.9	3375000	7.6741E-06	0.767			
	137	20.8	2571353	8.0891E-06	0.809			
	142	22.2	2863288	7.7533E-06	0.775			
	102	8.5	1061208	8.0097E-06	0.801			
	105	8.5	1157625	7.3426E-06	0.734			
	86	5.4	636056	8.4898E-06	0.849			
	96	7.3	884736	8.251E-06	0.825			
	143	21.2	2924207	7.2498E-06	0.725			
	139	21.1	2685619	7.8567E-06	0.786			
	138	20.8	2628072	7.9145E-06	0.791			
	139	20.5	2685619	7.6332E-06	0.763			
	145	24	3048625	7.8724E-06	0.787			
	108	8.8	1259712	6.9857E-06	0.699			
	115	11.6	1520875	7.6272E-06	0.763			
	101	8.8	1030301	8.5412E-06	0.854			
	101	8	1030301	7.7647E-06	0.776			
	139	21.6	2685619	8.0428E-06	0.804			
	133	19.6	2352637	8.3311E-06	0.833			
	135	18.6	2460375	7.5598E-06	0.756			
	121	13.6	1771561	7.6768E-06	0.768			
	125	14.1	1953125	7.2192E-06	0.722			
	107	9.6	1225043	7.8365E-06	0.784			
	95	7.1	857375	8.2811E-06	0.828			
	103	8.3	1092727	7.5957E-06	0.76			
	104	8.6	1124864	7.6454E-06	0.765			
2nd pool	121	14.6	1771561	8.2413E-06	0.824			
	185	56.6	6331625	8.9393E-06	0.894			
	163	39.3	4330747	9.0746E-06	0.907			
	152	31.9	3511808	9.0836E-06	0.908			
	126	15.4	2000376	7.6986E-06	0.77			
	132	21	2299968	9.1306E-06	0.913			
	101	9.5	1030301	9.2206E-06	0.922			
	131	20.4	2248091	9.0744E-06	0.907			
	132	19.8	2299968	8.6088E-06	0.861			
3rd big pool	135	18.3	2460375	7.4379E-06	0.744			
	114	12.8	1481544	8.6396E-06	0.864			
	148	27.3	3241792	8.4213E-06	0.842			
	136	21.8	2515456	8.6664E-06	0.867			
	164	42	4410944	9.5218E-06	0.952			
	152	30.1	3511808	8.5711E-06	0.857			

Upper Johnson								
Location	Length (mm)	Weight (g)	L power 3	W/L^3	k			
Trap 1	166	39.0	4574296	8.5259E-06	0.853	mean		0.809
Trap 2	168	40.0	4741632	8.4359E-06	0.844	ST dev		0.05008651
	157	33.6	3869893	8.6824E-06	0.868	n		60
	150	25.8	3375000	7.6444E-06	0.764	95% CI		0.01267364
	137	22.3	2571353	8.6725E-06	0.867			
	153	31.4	3581577	8.7671E-06	0.877			
	143	25.0	2924207	8.5493E-06	0.855			
	145	24.3	3048625	7.9708E-06	0.797			
	150	28.5	3375000	8.4444E-06	0.844			
	135	18.4	2460375	7.4785E-06	0.748			
	164	35.6	4410944	8.0708E-06	0.807			
	150	27.9	3375000	8.2667E-06	0.827			
	206	71.0	8741816	8.1219E-06	0.812			
	154	28.5	3652264	7.8034E-06	0.780			
	136	21.0	2515456	8.3484E-06	0.835			
	146	26.8	3112136	8.6114E-06	0.861			
	144	23.6	2985984	7.9036E-06	0.790			
	116	13.5	1560896	8.6489E-06	0.865			
	126	15.1	2000376	7.5486E-06	0.75485809			
	154	29.1	3652264	7.9677E-06	0.79676606			
	185	51.2	6331625	8.0864E-06	0.80863917			
	139	22.8	2685619	8.4897E-06	0.84896629			
	120	14.3	1728000	8.2755E-06	0.8275463			
	110	10.2	1331000	7.6634E-06	0.7663411			
	121	14.3	1771561	8.072E-06	0.80719772			
	122	13.5	1815848	7.4345E-06	0.7434543			
	120	13	1728000	7.5231E-06	0.75231481			
	113	10.6	1442897	7.3463E-06	0.73463317			
	116	10.7	1560896	6.855E-06	0.68550371			
Trap 3	192	56.8	7077888	8.025E-06	0.80249928			
	223	90.2	11089567	8.1338E-06	0.81337711			
	192	59.1	7077888	8.3499E-06	0.83499485			
	192	60.9	7077888	8.6043E-06	0.86042616			
	178	47.1	5639752	8.3514E-06	0.83514311			
	168	42.7	4741632	9.0053E-06	0.90053382			
	150	28.7	3375000	8.5037E-06	0.85037037			
	165	36.7	4492125	8.1699E-06	0.81698528			
	206	76.5	8741816	8.751E-06	0.87510421			
	156	30.5	3796416	8.0339E-06	0.8033893			
Trap 4	215	90.2	9938375	9.0759E-06	0.90759304			
60 fish seen	223	97.4	11089567	8.783E-06	0.878303			
	106	8.3	1191016	6.9688E-06	0.696884			
	103	8.3	1092727	7.5957E-06	0.75956758			
	124	13.4	1906624	7.0281E-06	0.70281293			
	99	6.9	970299	7.1112E-06	0.711121			
	101	7.9	1030301	7.6677E-06	0.76676622			
	129	16.8	2146689	7.826E-06	0.78260055			
	110	10.8	1331000	8.1142E-06	0.81141998			
	111	11	1367631	8.0431E-06	0.80431052			
	101	8.5	1030301	8.25E-06	0.82500163			
	95	6.6	857375	7.6979E-06	0.76979151			
	96	7.5	884736	8.4771E-06	0.8477105			
	125	16	1953125	8.192E-06	0.8192			
	106	9.8	1191016	8.2283E-06	0.8228269			
	105	9.2	1157625	7.9473E-06	0.79473059			
	109	10.5	1295029	8.1079E-06	0.81079265			
	107	9.5	1225043	7.7548E-06	0.77548298			
	113	11.5	1442897	7.9701E-06	0.79700769			
	97	7.8	912673	8.5463E-06	0.85463249			
	100	7.6	1000000	0.0000076	0.76			

Middle Sherman									
Location	Species	Length (mm)	Weight (g)	L power 3	W/L^3	k			
100-120m	Dolly	155	32.2	3723875	9E-06	0.865	mean		0.915
		133	18.8	2352637	8E-06	0.799	ST dev		0.078
		201	76.1	8120601	9E-06	0.937	n		21
		187	52.8	6539203	8E-06	0.807	95% CI		0.033
		72	3.2	373248	9E-06	0.857			
150m pool		114	14.3	1481544	1E-05	0.965			
		193	66.2	7189057	9E-06	0.921			
		111	10.2	1367631	7E-06	0.746			
		144	29.0	2985984	1E-05	0.971			
		144	25.6	2985984	9E-06	0.857			
		156	38.9	3796416	1E-05	1.025			
		131	22	2248091	1E-05	0.979			
		99	10	970299	1E-05	1.031			
		152	29.7	3511808	8E-06	0.846			
150 to 220m		123	16.8	1860867	9E-06	0.903			
missed 2		142	25.9	2863288	9E-06	0.905			
		169	42.8	4826809	9E-06	0.887			
		105	11.6	1157625	1E-05	1.002			
		135	23.9	2460375	1E-05	0.971			
		108	12.1	1259712	1E-05	0.961			
		83	5.6	571787	1E-05	0.979			

Upper Sherman									
Location	Species	Length (mm)	Weight (g)	L power 3	W/L^3	k			
60-90	Dolly	110	9.3	1331000	6.9872E-06	0.699	mean		0.825
Missed 1	Dolly	166	36.4	4574296	7.9575E-06	0.796	ST dev		0.08160267
	Dolly	137	20.0	2571353	7.778E-06	0.778	n		26
Missed 1	Dolly	77	4.0	456533	8.7617E-06	0.876	95% CI		0.03136706
Glide 4	Dolly	187	54.7	6539203	8.3649E-06	0.836			
90-120m	Dolly	102	9.8	1061208	9.2348E-06	0.923			
	Dolly	155	36.2	3723875	9.7211E-06	0.972			
	Dolly	157	36.2	3869893	9.3543E-06	0.935			
	Dolly	121	16.7	1771561	9.4267E-06	0.943			
	Dolly	80	3.5	512000	6.8359E-06	0.68359375			
	Dolly	131	18.8	2248091	8.3627E-06	0.83626508			
pool 130m	Dolly	106	8.9	1191016	7.4726E-06	0.74726116			
	Dolly	156	29.7	3796416	7.8232E-06	0.7823168			
	Dolly	142	27.2	2863288	9.4996E-06	0.94995683			
	Dolly	149	26	3307949	7.8599E-06	0.78598552			
	Dolly	114	11.1	1481544	7.4922E-06	0.74921838			
	Dolly	104	9.4	1124864	8.3566E-06	0.83565658			
	Dolly	156	29.7	3796416	7.8232E-06	0.7823168			
	Dolly	142	27.2	2863288	9.4996E-06	0.94995683			
	Dolly	149	26	3307949	7.8599E-06	0.78598552			
	Dolly	114	11.1	1481544	7.4922E-06	0.74921838			
	Dolly	104	9.4	1124864	8.3566E-06	0.83565658			
Glide to 180	Dolly	166	37.5	4574296	8.198E-06	0.81979828			
	Dolly	124	16.7	1906624	8.7589E-06	0.87589373			
	Dolly	145	23.2	3048625	7.61E-06	0.76099881			
	Dolly	104	8.5	1124864	7.5565E-06	0.7556469			

APPENDIX 4A: ADFG FISH RESOURCE PERMIT
(SF2010-068; fry counts)

STATE OF ALASKA
DEPARTMENT OF FISH AND GAME

P.O. BOX 115525
JUNEAU, ALASKA 99811-5525

Permit #: **SF2010-068**

Expires: **6/30/2010**

Collections Report Due: **7/30/2010**

FISH RESOURCE PERMIT
(For Scientific/Educational Purposes)

This permit authorizes **Liz Flory** *(whose signature is required on page 2 for permit validation)*
person

of **Aquatic Sciences (for Coeur Alaska)** **at** **3031 Clinton Drive, Suite 202, Juneau, AK 99801**
agency or organization *address*

to conduct the following activities **from** April 1, 2010 **to** June 30, 2010 in accordance with AS 16.05.930:

Purpose: To estimate the number of out-migrating pink salmon fry in creeks designated by an EPA issued NPDES permit for the Kensington Mine.

Location: *Lynn Canal*-Sherman/Sweeny Creeks *Berners Bay*-Slate/Johnson Creeks

Species Collected: Pink/chum/coho salmon, Dolly Varden, cutthroat trout, eulachon, and coast-range sculpin

Method of Capture: Fyke nets with adjustable wings or inclined plane traps **(see Permit Stipulations #2/3)**

Final Disposition: All fish must be released alive back into the system they were captured.
No more than the following numbers of mostly juvenile fish may be handled;
≤450K pink salmon *≤20K chum salmon* *≤500 coho salmon* *≤50 Dolly Varden* *≤50 cutthroat trout* *≤500 eulachon* *≤1K sculpin*
≤12,000 pink salmon smolts in total (≈150 per test) may be marked with Bismarck Brown dye and released above trap so as to determine smolt trap catch efficiency.

-Continued on Back-

REPORT DUE *July 30, 2010*. The collections report, using a template furnished by ADF&G), shall include **ALL** species, numbers, dates, and locations of collection (datum/GPS coordinates in the decimal degrees format (dd.ddddd)) and disposition, and if applicable, sex, age, and breeding condition, and lengths and weights of fish handled. *It must also include the date/time the local biologist was contacted prior to initiating collection activities.* A completion report (abstract, background, methods, data, analysis), if not submitted with the collection report described above, must be submitted to the department by; ***January/2011***. Data from such reports are considered public information. The report shall also include other information as may be required under the permit stipulations section.

GENERAL CONDITIONS, EXCEPTIONS AND RESTRICTIONS

1. This permit must be carried by person(s) specified during approved activities who shall show it on request to persons authorized to enforce Alaska's fish and game laws. This permit is nontransferable and will be revoked or renewal denied by the Commissioner of Fish and Game if the permittee violates any of its conditions, exceptions or restrictions. No redelegation of authority may be allowed under this permit unless specifically noted.
2. No specimens taken under authority hereof may be sold or bartered. All specimens must be deposited in a public museum or a public scientific or educational institution unless otherwise stated herein. Subpermittees shall not retain possession of live animals or other specimens.
3. The permittee shall keep records of all activities conducted under authority of this permit, available for inspection at all reasonable hours upon request of any authorized state enforcement officer.
4. Permits will not be renewed until the department has received detailed reports, as specified above.
5. UNLESS SPECIFICALLY STATED HEREIN, THIS PERMIT DOES NOT AUTHORIZE the exportation of specimens or the taking of specimens in areas otherwise closed to hunting and fishing; without appropriate licenses required by state regulations; during closed seasons; or in any manner, by any means, at any time not permitted by those regulations.

Bob Pawlowski
Fish Resource Permit Coordinator
Division of Sport Fish

Robert Begich
for Director
Division of Sport Fish

3-12-10
Date

Authorized Personnel: The following persons may perform collecting activities under terms of this permit:

Elizabeth Flory, Charmagne Gutierrez, Jill Michalak, Ray Pohl, Rachel Wadsworth, Gordon Willson

Employees and volunteers under the direct supervision of, and in the presence of, one of the authorized personnel listed above may participate in collecting activities under terms of this permit.

Permit Stipulations:

1) The local Area Management Biologist, **Brian Glynn** (465-4318; brian.glynn@alaska.gov) Juneau, must be notified **prior** to you engaging in any collecting activities. *The time/date of this contact must be included in your collections report (using the "data submission form" furnished by ADF&G.* This biologist has the right to specify methods for collecting, as well as limiting the collections, of any species by number, time and location.
2) **At a minimum, smolt traps must be checked on a daily basis prior to 10 am.** However it is recommended they be checked twice daily between 8 - 11 am and between 9pm - midnight. Each time a 10% or greater mortality event occurs at a smolt trap, you are required to call the AMB **(*Stipulation #1*)** to determine strategies that must be implemented for reducing future high mortality rates.
3) The stream channel may not be blocked by capture gear. Fyke nets and inclined plane traps must be operated in such a manner as to allow cutthroat trout and Dolly Varden to migrate freely up and down stream.
4) All unattended sampling gear must be; 1) labeled with the permittee's name, telephone number, and permit number, 2) securely tied to substrate, 3) located with GPS coordinates, and 4) accounted for/removed at the conclusion of sampling.
5) If anadromous fish species new to permitted streams and rivers are found, the permit holder will work closely with ADF&G to see that information is included in the database for the *Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes*. Anadromous fish include *Oncorhynchus spp.*, Arctic char, Dolly Varden, sheefish, smelts, lamprey, whitefish, and sturgeon. Please direct questions to J. Johnson, 267-2337 or j.johnson@alaska.gov
6) **Atlantic salmon** and other **non-native invasive aquatic species** that you encounter during your sampling should be killed. In such an event please contact the nearest ADF&G office (**Stipulation # 1**) ASAP with species identification or description, capture location or location of sighting if capture is not possible, number captured, size, and sex. Preserve and turn in the whole specimen to the nearest ADF&G office.
7) *A Title 16 Fish Habitat Permit is required from the Division of Habitat, Alaska Department of Fish and Game, to place structures (weir, etc.) in fish-bearing streams.*
8) *A copy of this permit, including any amendments, must be made available at all field collection sites and project sites for inspection upon request by a representative of the department or a law enforcement officer.*
9) Issuance of this permit does not absolve the permittee from compliance in full with any and all other applicable federal, state, or local laws, regulations, or ordinances.
10) A report of collecting activities, referenced to this fish resource permit number, must be submitted to the Alaska Department of Fish and Game, Division of Sport Fish HQ, P.O. Box 115525, Juneau, AK 99811-5525, Attention: Bob Piorkowski (465-6109; Robert.Piorkowski@alaska.gov), and to the AMB **(Stipulation #1)** within 30 days after the expiration of this permit. This report must summarize the number of fish captured by date, by location (provide GPS coordinates and datum), and by species, and the fate of those fish. Fish length, weight, sex, and age data should be included if collected. A completion report (abstract/background/methods /data/analysis), if not submitted with the collection report described above, must be submitted to the department within six months of the expiration of the permit. Data from such reports are considered public information. A report is required whether or not collecting activities were undertaken.

PERMIT VALIDATION requires permittee's signature agreeing to abide by permit conditions before beginning collecting activities:

_____

Signature of Permittee

cc: Brian Glynn, Division of Sport Fish, Juneau
Kevin Monagle, Division of Commercial Fish, Juneau
Randy Bachman, Division of Commercial Fisheries, Haines
Jackie Timothy, Division of Habitat, Juneau
Fish and Wildlife Protection, Juneau

APPENDIX 5: WEEKLY SALMON COUNTS

Appendix 5: Weekly salmon counts for Sherman, Johnson and Slate in 2010.

Johnson Creek Adult Pink Salmon Count				2010					
	7/22/10			7/29/10			8/6/12		
Reach	# Live	# Dead	chum	# Live	# Dead	chum	# Live	# Dead	chum
Mouth				0			20		30
Lace	40		10	40		30	50		30
Trap Site	20		10	40		30	100		60
#4	10			20		20	75		50
#7/8	4			10			20		10
#10	0			50			100		
Powerhouse	0			2			6		
Log falls	0			4			10		
#15	0			0			0		
Up to falls	0			0			0		
Total	74	0	20	166		80	381		180

	8/11/10			8/18/10			8/22/10		
Reach	# Live	# Dead	Chum	# Live	# Dead	Notes	# Live	# Dead	Notes
Mouth	50		30	0			0	0	
Lace	65		20	0			0	0	
John mouth	250		20	300			120	10	
Trap Site	200		10	200			100	25	
#4	40			300	10		240	20	
#7/8	270			560	10		80	0	
#10	20			20			65	10	
Powerhouse	40			40			110	10	
Log falls	10			10			10	0	
#15	0			10			10	10	
Up to falls	0			0			10	0	
Total	945	0	80	1440	20	0	745	85	0

	8/29/10			9/8/10		
Reach	# Live	# Dead	Notes	# Live	# Dead	Notes
Mouth	0			0		
Lace	0			0		
John mouth	150			0	0	Very low flows
Trap Site	170			0	0	No Dead fish either
#4	80	20		0	0	Black Bear below trap site
#7/8	30			0	0	
#10	10	20		0	0	
Powerhouse	30	2		0	0	
Log falls	0	2		0	0	
#15	4	1		0	0	
Up to falls	4	0		0	0	
Total	478	45	0	0	0	0

Appendix 5 cont.

2010	Sherman Creek Adult Pink Salmon Count								
		7/20/10		7/26/10			8/2/12		
Reach	# Live	# Dead	Notes	# Live	# Dead	Notes	# Live	# Dead	Notes
intertidal	0		salmon jur	0			60		
0-50	0			1			60		
50-100	0			1			24		
100-150	0			0			42		
150-200	0			1			28		
200-250	0			0			30		
250-300	0			1			30		
300-350	0			2			20		
falls pool	0			0			10		
Total				6	0	0	304	0	0

	8/10/10			8/16/10			8/22/12		
Reach	# Live	# Dead	Notes	# Live	# Dead	Notes	# Live	# Dead	Notes
intertidal	90	3		80	12		102	26	
0-50	100	3		115	8		107	16	
50-100	40	3		80	5		215	70	
100-150	80	2		106	7		197	43	
150-200	65	2		115	12		112	37	
200-250	50	1		96	10		94	18	
250-300	54	2		80	8		86	10	
300-350	48	1		56	3		21	2	
falls pool	24	0		20	2		11	1	
Total	551	17		748	67	0	945	223	0

	8/29/10			9/8/10			9/14/10		
Reach	# Live	# Dead	Notes	# Live	# Dead	Notes	# Live	# Dead	Notes
intertidal	155	0	low flow	13	2	low flow	4		low flow
0-50	120	45		20	14		6	12	
50-100	45	41		20	14		6	12	
100-150	83	51		33	55		10	22	
150-200	95	41		44	40		16	26	
200-250	72	32		14	12		6	8	
250-300	75	16		12	3		4	6	
300-350	62	9		14	6		4	3	
falls pool	10	0		2	0		0	0	
Total	717	235		172	146		56	89	

Appendix 5 cont.

Slate Creek Adult Pink Salmon Count									
	7/26/10			8/2/10			8/9/10		
Reach	# Live	# Dead	Notes	# Live	# Dead	Notes	# Live	# Dead	Notes
intertidal1	0			130			70		
intertidal2	0			100			184	2	
0-100	0			22			170	6	
100-200	0			0			250	4	
200-300	1			2	4		230	4	
300-400	0			0			240	5	
400-500	0			0			200	3	
500-600	0			0			200	2	
600-700	0			0			234	6	
700-800	0			0			35	1	
800-900	0			0			0	0	
Total	1	0	0	254	4	0	1813	33	0

Slate Creek Adult Pink Salmon Count									
	8/16/10			8/22/10			8/29/10		
Reach	# Live	# Dead	Notes	# Live	# Dead	Notes	# Live	# Dead	Notes
intertidal1	80	1		200	200		0	50	
intertidal2	210	120		245	233		0	98	
0-100	230	87		245	185		19	267	
100-200	250	90		265	255		2	366	
200-300	190	61		230	233		0	239	
300-400	225	51		200	260		2	308	
400-500	245	68		230	218		0	99	
500-600	300	92		200	212				stop @ 480r
600-700	235	30		76	88				
700-800	50	5		4	6				
800-900	0	0		0	0				
Total	2015	605	0	1895	1890	0	23	1427	0