Technical Report No. 16-06

Tulsequah Chief Acid Mine Drainage and Dolly Varden Char Whole Body Metals Concentrations

by

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October 2016

Alaska Department of Fish and Game **Division of Habitat**

Symbols and Abbreviations

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Weights and measures (metric)

centimeter	cm
deciliter	dL
gram	g
hectare	ha
kilogram	kg
kilometer	km
liter	L
meter	m
milliliter	mL
millimeter	mm

Weights and measures (English)

cubic feet per second	ft^3/s
foot	ft
gallon	gal
inch	in
mile	mi
nautical mile	nmi
ounce	oz
pound	lb
quart	qt
yard	yd

Time and temperature

day	d
degrees Celsius	°C
degrees Fahrenheit	°F
degrees kelvin	K
hour	h
minute	min
second	s

Physics and chemistry

all atomic symbols	
alternating current	AC
ampere	A
calorie	cal
direct current	DC
hertz	Hz
horsepower	hp
hydrogen ion activity (negative log of)	pH
parts per million	ppm
parts per thousand	ppt, ‰
volts	V
watts	W

General

Alaska Administrative Code	AAC
all commonly accepted abbreviations	e.g., Mr., Mrs., AM, PM, etc.
all commonly accepted professional titles	e.g., Dr., Ph.D., R.N., etc.
at	@
compass directions:	
east	E
north	N
south	S
west	W
copyright	©
corporate suffixes:	
Company	Co.
Corporation	Corp.
Incorporated	Inc.
Limited	Ltd.
District of Columbia	D.C.
et alii (and others)	et al.
et cetera (and so forth)	etc.
exempli gratia (for example)	e.g.
Federal Information Code	FIC
id est (that is)	i.e.
latitude or longitude	lat. or long.
monetary symbols (U.S.)	$, ¢
months (tables and figures): first three letters	Jan,...,Dec
registered trademark	®
trademark	™
United States (adjective)	U.S.
United States of America (noun)	USA
U.S.C.	United States Code
U.S. state	use two-letter abbreviations (e.g., AK, WA)

Measures (fisheries)

fork length	FL
mideye-to-fork	MEF
mideye-to-tail-fork	METF
standard length	SL
total length	TL

Mathematics, statistics

all standard mathematical signs, symbols and abbreviations	
alternate hypothesis	H_A
base of natural logarithm	*e*
catch per unit effort	CPUE
coefficient of variation	CV
common test statistics	(F, t, χ^2, etc.)
confidence interval	CI
correlation coefficient (multiple)	R
correlation coefficient (simple)	r
covariance	cov
degree (angular)	°
degrees of freedom	df
expected value	*E*
greater than	>
greater than or equal to	≥
harvest per unit effort	HPUE
less than	<
less than or equal to	≤
logarithm (natural)	ln
logarithm (base 10)	log
logarithm (specify base)	log_2, etc.
minute (angular)	'
not significant	NS
null hypothesis	H_O
percent	%
probability	P
probability of a type I error (rejection of the null hypothesis when true)	α
probability of a type II error (acceptance of the null hypothesis when false)	β
second (angular)	"
standard deviation	SD
standard error	SE
variance	
population	Var
sample	var

TECHNICAL REPORT NO. 16-06

TULSEQUAH CHIEF ACID MINE DRAINAGE AND DOLLY VARDEN CHAR WHOLE BODY METALS CONCENTRATIONS

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October 2016

The Alaska State Legislature appropriated partial funding for this study in the FY2010 and FY2013 capital budgets.

Cover: Tulsequah River near the Tulsequah Chief Mine site.

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This document should be cited as
Legere, N. M., and J. Timothy. 2016. Tulsequah Chief acid mine drainage and Dolly Varden char whole body metals concentrations. Alaska Department of Fish and Game, Technical Report No. 16-06, Douglas, AK.

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ACKNOWLEDGEMENTS

The Alaska Department of Fish and Game Divisions of Sport Fish and Commercial Fisheries provided air and boat transportation, field equipment, food and accommodations at the Smolt and Canyon Island field camps. We sincerely appreciate Fisheries Biologists Jeff Williams and Jim Andel, and Fish and Wildlife Technicians Nathan Frost, Travis Orient, and Michael Enders for navigating the rivers and providing field support.

Division of Commercial Fisheries Biometrician Kray Van Kirk and Division of Sport Fish Regional Fisheries Research Coordinator Jeff Nichols assisted with statistical analysis and reviewed the draft report. Division of Commercial Fisheries Publication Specialist Amy Carroll prepared the report for publication.

Division of Habitat Operations Manager Dr. Al Ott and Habitat Biologists Parker Bradley and Kate Kanouse reviewed the draft report. Habitat Biologists Joe Hitselberger and Gordon Willson-Naranjo, and Fish and Wildlife Technician Richard Hoffman, assisted with fieldwork.

Chieftain Metals Inc. Chief Operating Officer Keith Boyle and Chieftain Mine Manager Terry Zanger provided field support and accommodations at the Tulsequah Chief Mine camp.

We include statewide juvenile Dolly Varden char whole body metals concentrations data and graphs in Appendix A. Teck Cominco, Ltd., Hecla Greens Creek Mining Company, Coeur Alaska, Inc., and the Pebble Limited Partnership funded the acquisition of these data.

Thank you all so very much.

EXECUTIVE SUMMARY

Acid drainage from the legacy Tulsequah Chief copper, zinc, lead, gold, and silver mine in British Columbia has been leaching into the Tulsequah River for 60 years. Palmer et al. (2013) identified cadmium, copper, lead, and zinc as elements of potential concern with Steffen et al. (1992) and Brodie and Chapman (1993) citing the release of copper to the Tulsequah River as the greatest concern confirmed by total load estimate distribution for the metal.

In 2010, at the request of commercial fishing organizations, Representative Beth Kerttula secured a $35,000 legislative appropriation for the Alaska Department of Fish and Game (ADF&G) to study the effects of the acid drainage on fish. The legislature did not specify a study type or design, so we consulted with ADF&G and Canadian scientists, considered several aquatic studies, and concluded the best way to evaluate the effects of the drainage on fish was to test the metals concentrations in fish tissues.

The scientists agreed juvenile Dolly Varden char *Salvelinus malma* were the appropriate fish to test since they are resident and exposed to the elements year round, rather than briefly as salmon are. Additionally, Chapman (1978a, 1978b) documents Pacific salmon *Oncorhynchus* and specifically Chinook *O. tshawytscha* and sockeye *O. nerka* exhibiting more metal tolerance with equivalent exposure than *Salvelinus*, the genus to which Dolly Varden char belong.

In 2011, with British Columbia Ministry of Environment and Taku River Tlingit First Nation staffs, ADF&G sampled resident juvenile Dolly Varden char upstream, downstream, and at the acid drainage sites described in Gartner Lee (2008) and Lough and Sharpe (2003). We contracted a private laboratory to analyze the fish samples for the elements of potential concern and for additional elements of interest—arsenic, mercury, selenium and silver. The data are published in Hitselberger (2012).

In January 2010, Chieftain Metals, Inc. negotiated for area mining interests, and the purchase agreement included a partially constructed water treatment plant for treating acid drainage (SRK 2010). After property title and assets were transferred in September 2010, Chieftain Metals completed the water treatment plant and operated it between March and June 2012 (Chieftain Metals, Inc. 2012). We did not sample fish during water treatment plant operation.

In 2012, at the request of commercial fishing organizations and the Southeast Alaska Conservation Council, Senator Dennis Egan secured ADF&G another $37,000 legislative appropriation to continue the study. We sampled 4 more times between the autumn of 2014 and spring of 2016.

The whole body metals concentrations in juvenile Dolly Varden char we captured near acid drainage in the Tulsequah River are similar to samples we took upstream and downstream of mine drainage influence.[1] Possible explanations may include uniform weathering and erosion of crustal rocks throughout the watershed, dilution at the sampling sites below the mine, or exposure levels at the discharge within a range Dolly Varden char can bioregulate. For comparison, the mean metals concentrations in this study are lower than the mean metals[2]

---

[1] While similar, there are statistical differences for selenium and mercury among sites, which we discuss in the *Results*.

[2] We do not sample for arsenic at the Greens Creek Mine.

concentrations in a 15-year study at a Greens Creek site upstream of industrial mining on Admiralty Island (Brewster 2016a).

Appendix A contains the whole body metals concentrations of 1,270 juvenile Dolly Varden char sampled between 1993 and 2015 at the Red Dog lead and zinc mine in Northwest Alaska (Ott et al. 2016), the Pebble Prospect in Southcentral Alaska (Harper et al. 2013), the Greens Creek silver, zinc, gold and lead mine in Southeast Alaska (Brewster 2016a), the Kensington gold mine in Southeast Alaska (Brewster 2016b), and the abandoned Tulsequah Chief polymetallic mine. Since the literature does not provide reference levels above which whole body metals concentrations become a liability for salmonids, we have graphed the data mean, median, maximum, and minimum to illustrate the range of values observed across the state to improve our understanding of juvenile Dolly Varden char whole body metals concentrations variability.

INTRODUCTION

PURPOSE

The purpose of this study is to compare whole body concentrations of arsenic (As), cadmium (Cd), copper (Cu), lead (Pb), mercury (Hg), selenium (Se), silver (Ag), and zinc (Zn) in juvenile Dolly Varden char captured in the receiving waters of Tulsequah Chief Mine acid drainage with juvenile Dolly Varden char collected upstream and downstream of the Tulsequah Chief Mine and at a Greens Creek Mine site upstream of mining located about 92 km to the southwest.

SAMPLE SITES

We sampled 2 locations on the Tulsequah River; 1 upstream of the mine site, Upper Tulsequah River (UTR), and the other in the receiving waters downstream of the mine site, Tulsequah River Mine (TRM). We sampled 1 location on the Taku River near the U.S./Canada border, Taku River Border (TRB). Sampling sites varied from year to year due to changing water levels and channel migration (Figure 1).

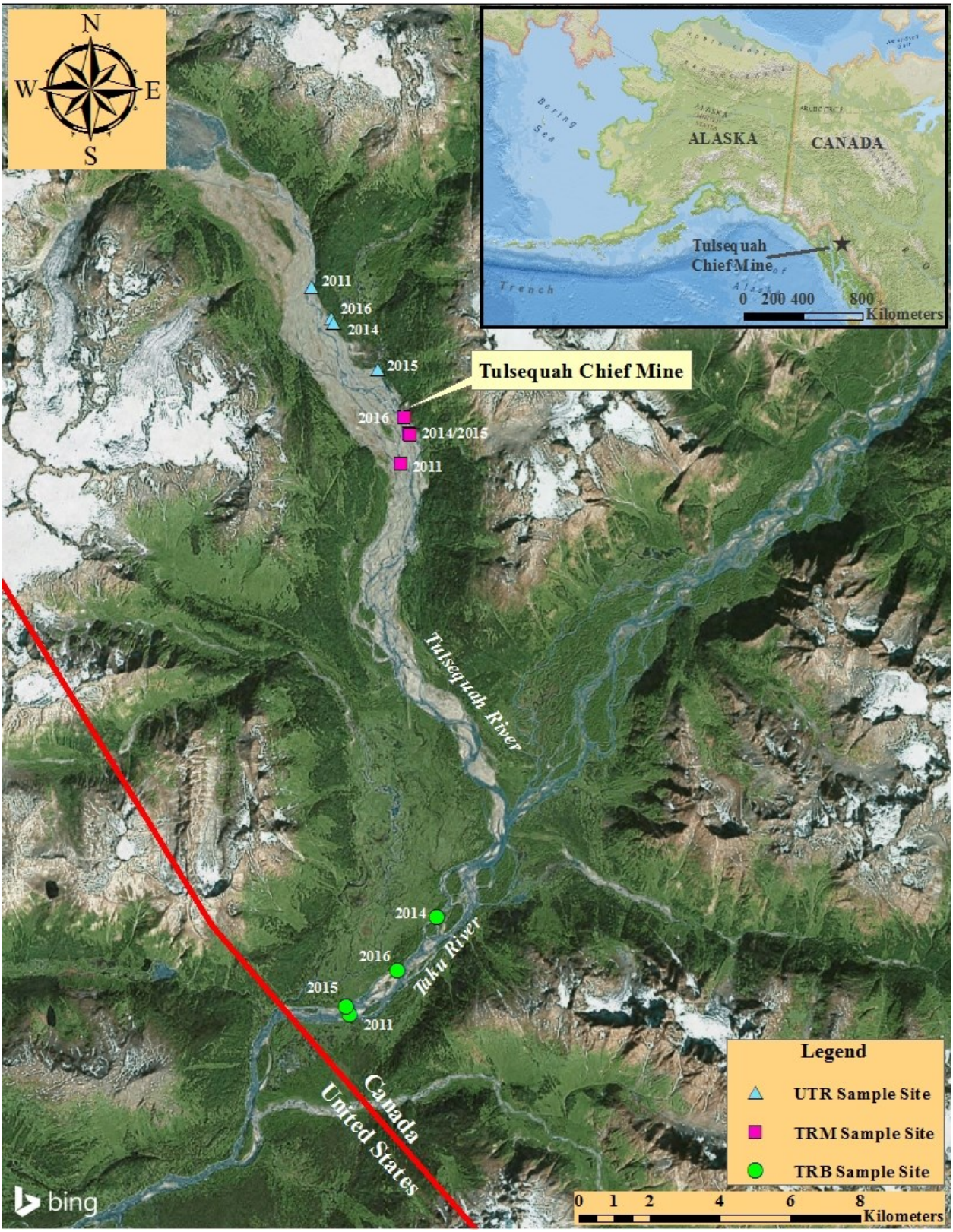

Figure 1.–Area map with sample sites by year.

Upper Tulsequah River

UTR is located upstream of the Tulsequah Chief Mine and downstream of the Tulsequah Glacier. We sampled within a 2.5 km reach. In 2011, we accessed the area by helicopter and in 2014 and 2015 we accessed the area by jet boat. In 2016, we accessed the area on foot from the road adjacent to the Tulsequah Chief Mine airstrip (Figure 2).

The upper Tulsequah River is a large braided glacial outwash channel (Paustian 2010). Gradient is less than 3% and substrate is composed mostly of round cobble, coarse gravel, and sand (Figure 3). There are a few backwatered areas and large woody debris accumulations along the channel margins. We captured Dolly Varden char and sculpin *Cottus* spp. at UTR.

Figure 2.–UTR adjacent to the Tulsequah Chief Mine airstrip.

Figure 3.–UTR substrate.

Tulsequah River Mine

TRM is downstream of the Tulsequah Chief Mine discharge site. We sampled within a 1.5 km reach. In 2011, we accessed the area by helicopter, and in 2014 and 2015 we accessed the area by jet boat. In 2016, we accessed the area on foot from the Tulsequah Chief Mine road beginning about 80 m downstream of mine discharge.

This section of the Tulsequah River is similarly characterized as a large braided glacial outwash channel (Paustian 2010). The less than 3% gradient and shallow braided channels are composed of coarse gravel and round cobble (Figure 4) and contain accumulations of large woody debris (Figure 5). There is limited overhanging riparian vegetation. We captured Dolly Varden char, coho salmon *O. kisutch,* and sculpin at TRM.

Figure 4.–TRM substrate.

Figure 5.–TRM woody debris.

Taku River Border

TRB is located on the Taku River mainstem near the U.S./Canada border, about 26 km downstream of the Tulsequah Chief Mine. We sampled within a 3.5 km reach upstream of the border and about 3.5 km downstream of the Tulsequah River confluence. In all years, we accessed the area by jet boat.

This section of the Taku River is also characterized as a large braided glacial outwash channel (Paustian 2010). This less than 3% gradient portion of the river is composed of mostly gravel and sand (Figure 6). Large woody debris has accumulated along sand bars and channel margins and overhanging riparian vegetation provides fish habitat (Figure 7). We captured Dolly Varden char, juvenile Chinook and coho salmon, and sculpin at TRB.

Figure 6.–TRB channel.

Figure 7.–TRB woody debris.

METHODS

DATA COLLECTION

In 2011, we used a jet boat and helicopter to access the sample sites. In 2014 and 2015, ADF&G Divisions of Commercial Fisheries and Sport Fish staff stationed at Canyon Island provided jet boat transportation to the sample sites. In 2016, Division of Sport Fish staff provided jet boat transportation to the TRB and Chieftain Metals Inc. staff provided vehicle access to UTR and TRM. We collected basic water quality data with a YSI Pro 2030 meter and colorpHast pH indicator strips.

We set 10 two-piece 0.635 cm (1/4 in) galvanized steel minnow traps overnight at each site using methods described in Magnus et al. (2006). We baited the traps with disinfected salmon eggs contained in a punctured plastic bag to prevent ingestion and reduce the possibility of sample contamination. In 2011, we used a beach seine in addition to minnow traps at the UTR and TRM sample sites.

We proposed to retain Dolly Varden char between 90 and 130 mm fork length at each sample location. A 90 mm fish provides the minimum 5 g weight requirement for lab testing (Timothy and Kanouse 2014) and a 130 mm fish is small enough to reasonably conclude it is resident and nonanadromous. We were unable to capture enough fish meeting the size criteria and therefore retained fish between 56 and 170 mm. We processed fish not meeting the 90 mm criteria as a composite sample of 2 when we did not meet the 5 g lab weight requirement. We identified, counted and released all fish that were not Dolly Varden char.

We wore latex gloves when handling fish, measured fork length (mm) of every Dolly Varden char, and placed them in individually numbered plastic bags labeled with the date, location, species, and juvenile status. Bags containing individual fish were then placed in a larger sample bag labeled with the sample location. We immediately stored the samples in an insulated cooler with ice packs and then in a –20°C freezer upon return to Juneau. We remeasured fork length of each fish and recorded fish weight (g) in the sample bag, correcting for the weight of the bag. We kept the samples in the low temperature freezer until ready for shipment. We shipped the samples to the lab in a cooler with frozen icepacks via overnight air freight.

LABORATORY ANALYSES

We solicited venders through the State of Alaska procurement process and selected ALS Environmental to process the samples based on their experience testing metals concentrations in fish tissues. The Environmental Protection Agency (EPA) has approved the methods shown in Table 1 which were adopted by ALS Environmental during testing. The laboratory received all samples in good condition, stored the samples at –20°C, then individually freeze dried, digested, and analyzed the samples for whole body metals concentrations of Ag, As, Cd, Cu, Hg, Pb, Se, and Zn, on a dry-weight basis. The laboratory reports are in Appendix B.

Table 1.–Tests, analytes and methods.

Test Description	Analyte	EPA Method
Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry	Hg	1631E, Revision E
Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma – Mass Spectrometry	Ag, As, Cd, Cu, Pb, Se, Zn	200.8, Revision 5.4
EPA method 6020A, Inductively Coupled Plasma – Mass Spectrometry	Ag, As, Cd, Cu, Pb, Se, Zn	6020A, Revision 6

Note: EPA 200.8 analysis method was used during the August 21, 2014 and September 3, 2015 sampling period.

QUALITY ASSURANCE / QUALITY CONTROL

We maintained written chain of custody forms for all samples submitted to the laboratory. The laboratory provided Tier II quality assurance/quality control information including results for matrix spikes, standard reference materials, sample blanks, and sample duplicates.

STATISTICAL ANALYSES AND DATA PRESENTATION

We present the number of Dolly Varden char and coho and Chinook salmon juveniles captured at UTR, TRM and TRB during each sampling event between 2014 and 2016 and basic water quality data at each site during each sampling event between 2011 and 2016.

We used Statistix® 10 and the Kruskal-Wallis one-way analysis of variance by ranks test, a non-parametric alternative to a one-way analysis of variance, to test for differences of mean ranks for each analyte at UTR, TRM, and TRB. We used the Dunn's multiple comparison test to identify differences between UTR, TRM, and TRB. We report significant differences when $p \leq 0.05$.

We present graphs of the mean, maximum, and minimum analyte concentrations for all sampling events at UTR, TRM, and TRB.

We present graphs of the mean, maximum, and minimum pooled analyte concentrations for the UTR, TRM, and TRB with data collected between 2001 and 2015 above the Greens Creek Mine[3,4] located on Admiralty Island, about 92 km southwest of the Tulsequah Chief Mine.

We present a scatterplot of individual analyte concentrations at UTR, TRM, and TRB for all years, reporting nondetections at the method reporting limit so the number of data points equals the number of samples.

We present UTR, TRM, and TRB sample size and pooled mean analyte concentration with uncertainty as plus or minus one standard deviation from the mean. Nondetections are included at the method reporting limit.

[3] For all analytes except As.

[4] We exclude 2012 Cu data because of a lab error.

RESULTS

We captured a total of 162 Dolly Varden char, 209 coho salmon, 70 Chinook salmon, and 8 sculpin (Figures 8–10). We returned all coho and Chinook salmon, sculpin, and Dolly Varden char not needed for analysis to the water body. We submitted 29 samples from UTR, 52 samples from TRM, and 20 samples from TRB.

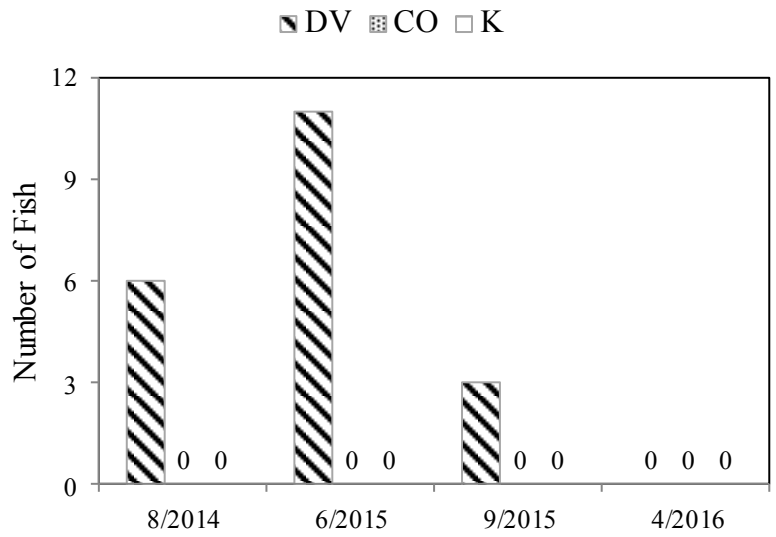

Figure 8.–UTR Dolly Varden char (DV), coho (CO) and Chinook (K) salmon juvenile captures, 2014 through 2016.
Note: We do not have the 2011 total catch data.

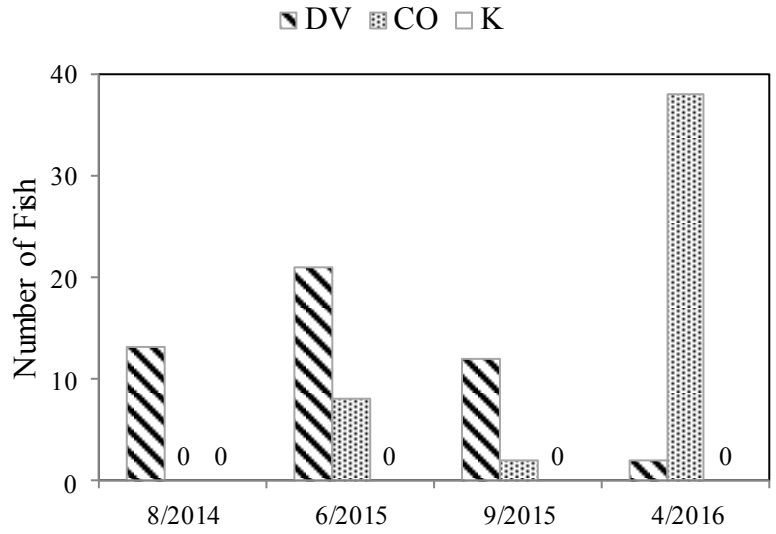

Figure 9.– TRM Dolly Varden char (DV), coho (CO) and Chinook (K) salmon juvenile captures, 2014 through 2016.
Note: We do not have the 2011 total catch data.

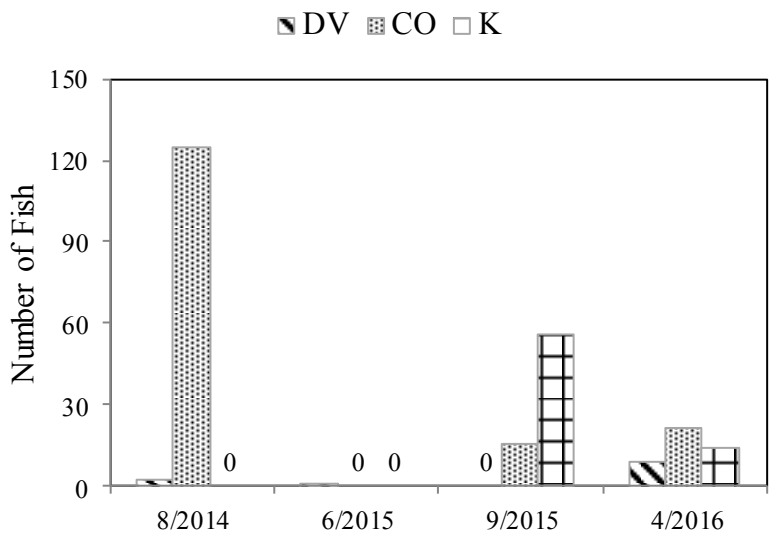

Figure 10.– TRB Dolly Varden char (DV), coho (CO) and Chinook (K) salmon juvenile captures, 2014 through 2016.
Note: We do not have the 2011 total catch data.

We collected basic water quality data at each site during each sampling event (Table 2).

Table 2.–Water quality data collected in the Tulsequah and Taku Rivers.

Date	Location	DO (mg/L)	Conductivity (µS/cm)	Temperature (°C)	Salinty (ppt)	pH
6/15/2011	UTR	–	70.5	1.4	–	5.0
8/20/2014	UTR	17.5	63.8	0.7	0.0	–
6/15/2015	UTR	13.8	76.7	3.3	0.0	–
9/2/2015	UTR	12.3	33.8	2.1	0.0	6.0
4/23/2016	UTR	13.2	42.6	1.8	0.0	6.0
6/15/2011	TRM	–	73.6	3.2	–	6.0
8/20/2014	TRM	17.9	68.7	2.5	0.0	–
6/15/2015	TRM	13.2	77.3	5.2	0.0	–
9/2/2015	TRM	11.0	44.1	3.8	0.0	5.5
4/24/2016	TRM	12.8	54.9	2.4	0.0	5.0
6/15/2011	TRB	–	126.7	9.8	–	7.0
8/20/2014	TRB	13.2	124.4	11.6	0.1	–
6/15/2015	TRB	11.4	123.3	10.8	0.1	–
9/2/2015	TRB	9.3	109.1	9.3	0.1	6.0
4/23/2016	TRB	11.7	118.9	6.2	0.1	6.0

Note: – Indicates data was not collected.

UPPER TULSEQUAH RIVER

We submitted 29 UTR fish for laboratory analyses (Table 3; Figure 11). Three of the samples were a composite of 2 fish each.

Table 3.–UTR juvenile Dolly Varden char whole body metals concentrations (mg/kg).

Date	Sample Number	Ag	As	Cd	Cu	Hg	Pb	Se	Zn
6/15/2011	061511UTRDVJ1	0.02	1.5	0.38	4.8	0.086	0.64	3.3	115
6/16/2011	061611UTRDVJ2	<0.02	0.8	0.13	3.4	0.041	0.16	4.4	116
6/16/2011	061611UTRDVJ3	0.02	<0.5	0.11	3.2	0.030	0.04	3.4	161
6/16/2011	061611UTRDVJ4	<0.02	0.5	0.09	3.4	0.021	0.19	2.3	139
6/16/2011	061611UTRDVJ5	<0.02	0.8	0.41	4.5	0.048	0.36	3.3	158
6/16/2011	061611UTRDVJ6	<0.02	<0.5	0.25	4.0	0.034	0.06	3.8	167
6/16/2011	061611UTRDVJ7	<0.02	<0.5	0.16	2.7	0.088	0.06	2.8	154
6/16/2011	061611UTRDVJ8	<0.02	<0.5	0.07	2.4	0.067	0.05	2.5	111
6/16/2011	061611UTRDVJ9	<0.04	<1.0	0.16	3.8	0.064	0.29	2.9	162
6/16/2011	061611UTRDVJ10	<0.02	<0.5	0.25	4.7	0.058	0.18	2.6	201
6/16/2011	061611UTRDVJ11	<0.02	<0.5	0.20	4.2	0.047	0.03	3.0	194
6/16/2011	061611UTRDVJ12	<0.02	<0.5	0.15	2.8	0.033	0.07	4.8	118
8/21/2014	082114UTRDVJ1	<0.02	0.6	0.07	3.1	0.037	0.18	1.9	116
8/21/2014	082114UTRDVJ2	0.20	<0.5	0.36	9.7	0.106	0.10	2.5	264
8/22/2014	082214UTRDVJ3	<0.02	<0.5	0.06	2.6	0.027	0.05	3.4	123
8/22/2014	082214UTRDVJ4	<0.02	<0.5	0.09	2.8	0.021	0.07	3.2	132
8/22/2014	082214UTRDVJ5	<0.02	0.9	0.15	4.3	0.040	0.38	2.1	122
8/22/2014	082214UTRDVJ6	<0.02	1.3	0.43	3.6	0.059	0.20	2.4	164
6/16/2015	061615UTRDVJ1	<0.02	0.6	0.18	36.0	0.039	0.19	2.2	130
6/16/2015	061615UTRDVJ2	<0.02	1.4	0.46	4.2	0.080	0.12	3.9	163
6/16/2015	061615UTRDVJ3	<0.02	0.7	0.12	4.0	0.056	0.11	3.2	144
6/16/2015	061615UTRDVJ4	<0.02	0.8	0.12	3.6	0.061	0.17	2.8	128
6/16/2015	061615UTRDVJ5	<0.02	0.6	0.12	3.5	0.022	0.51	3.3	165
6/16/2015	061615UTRDVJ6[a]	<0.02	0.9	0.30	4.0	0.048	0.13	4.6	147
6/16/2015	061615UTRDVJ7[a]	<0.02	1.0	0.10	2.7	0.046	0.08	3.5	124
6/16/2015	061615UTRDVJ8[a]	<0.02	1.3	0.22	3.8	0.062	0.16	3.9	127
9/3/2015	090315UTRDVJ1	<0.02	0.5	0.38	3.0	0.032	0.16	2.8	156
9/3/2015	090315UTRDVJ2	<0.02	0.8	0.28	3.0	0.057	0.13	3.5	123
9/3/2015	090315UTRDVJ3	0.10	0.6	0.29	2.6	0.058	0.03	3.5	138

[a] Composite sample of 2 fish.

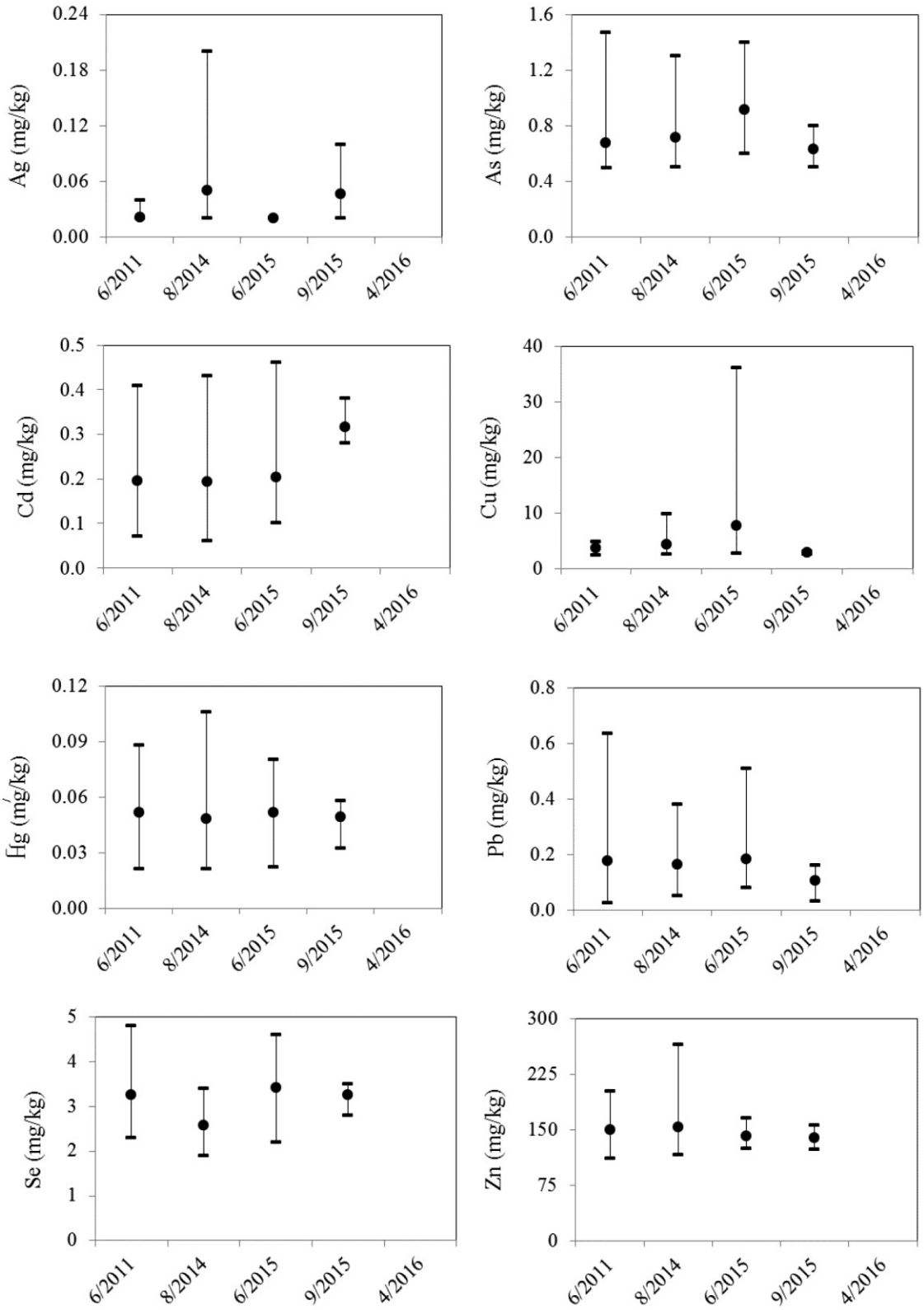

Figure 11.–UTR juvenile Dolly Varden char whole body metals concentrations.
Note: We did not capture juvenile Dolly Varden char at UTR in 2016.

TULSEQUAH RIVER MINE

We submitted 52 TRM fish for laboratory analyses (Table 4; Figure 12). Three of the samples were a composite of 2 fish each. In April 2016, water levels were lower than any other sampling event and though we only captured 2 Dolly Varden char, we captured 38 juvenile coho salmon in our minnow traps.

Table 4.–TRM juvenile Dolly Varden char whole body metals concentrations (mg/kg).

Date	Sample Number	Ag	As	Cd	Cu	Hg	Pb	Se	Zn
6/16/2011	061611TRMDVJ1	<0.02	0.6	0.12	4.0	0.041	0.06	2.5	157
6/16/2011	061611TRMDVJ2	<0.02	0.9	0.19	2.9	0.069	0.12	4.9	97
6/16/2011	061611TRMDVJ3	<0.02	<0.5	0.12	2.4	0.039	0.04	3.7	89
6/16/2011	061611TRMDVJ4	<0.02	1.4	0.23	5.1	0.028	0.35	3.5	118
6/16/2011	061611TRMDVJ5	<0.02	1.0	0.23	4.9	0.063	0.07	3.5	156
6/16/2011	061611TRMDVJ6	<0.02	0.9	0.24	4.1	0.064	0.15	3.9	156
6/16/2011	061611TRMDVJ7	<0.02	<0.5	0.12	3.2	0.030	0.06	2.9	115
6/16/2011	061611TRMDVJ8	<0.02	0.7	0.15	3.4	0.045	0.08	3.8	145
6/16/2011	061611TRMDVJ9	<0.02	0.7	0.14	3.9	0.029	0.09	2.8	141
6/16/2011	061611TRMDVJ10	<0.02	0.9	0.34	5.1	0.038	0.11	2.9	149
6/16/2011	061611TRMDVJ11	<0.02	1.3	0.24	4.7	0.035	0.17	4.0	152
6/16/2011	061611TRMDVJ12	<0.02	1.0	0.16	4.6	0.060	0.06	2.7	154
6/16/2011	061611TRMDVJ13	<0.02	1.1	0.19	4.0	0.060	0.12	4.0	138
6/16/2011	061611TRMDVJ14	<0.02	<0.5	0.11	3.6	0.032	0.06	2.8	110
6/16/2011	061611TRMDVJ15	<0.02	<0.5	0.16	4.0	0.048	0.09	3.8	143
6/16/2011	061611TRMDVJ16	<0.02	0.8	0.16	6.0	0.046	0.05	4.1	144
6/16/2011	061611TRMDVJ17	<0.02	0.6	0.13	3.4	0.022	0.05	2.6	120
6/16/2011	061611TRMDVJ18	<0.02	0.8	0.10	3.6	0.273	0.20	1.9	167
6/16/2011	061611TRMDVJ19	<0.02	0.6	0.17	4.3	0.043	0.09	2.9	131
6/16/2011	061611TRMDVJ20	<0.02	0.8	0.18	4.0	0.057	0.15	3.8	155
8/21/2014	082114TRMDVJ1	<0.02	<0.5	0.35	3.2	0.033	0.05	2.7	149
8/21/2014	082114TRMDVJ2[a]	<0.02	0.6	0.37	3.0	0.037	0.08	4.0	123
8/21/2014	082114TRMDVJ3	<0.02	<0.5	0.27	4.4	0.044	0.08	2.7	154
8/21/2014	082114TRMDVJ4	<0.02	0.6	0.24	3.4	0.035	0.12	2.7	133
8/21/2014	082114TRMDVJ5	<0.02	0.7	0.15	2.9	0.027	0.05	2.4	141
8/21/2014	082114TRMDVJ6	<0.02	<0.5	0.12	2.3	0.054	0.03	2.4	114
8/21/2014	082114TRMDVJ7	<0.02	0.6	0.30	3.5	0.043	0.11	3.4	119
8/21/2014	082114TRMDVJ8[a]	<0.02	0.9	0.37	5.3	0.037	0.22	2.8	154
8/21/2014	082114TRMDVJ9[a]	<0.02	0.7	0.49	3.5	0.041	0.06	2.8	112
8/21/2014	082114TRMDVJ10	0.04	0.5	0.34	3.5	0.028	0.07	6.4	143
6/16/2015	061615TRMDVJ1	<0.02	0.5	0.36	4.5	0.031	0.09	2.8	140
6/16/2015	061615TRMDVJ2	<0.02	0.5	0.30	5.3	0.031	0.06	3.3	159
6/16/2015	061615TRMDVJ3	<0.02	0.6	0.27	3.5	0.031	0.07	5.3	120
6/16/2015	061615TRMDVJ4	<0.02	0.6	0.13	3.3	0.022	0.03	6.8	137
6/16/2015	061615TRMDVJ5	<0.02	0.6	0.52	5.5	0.039	0.09	2.9	186

-continued-

Table 4.–Page 2 of 2.

Date	Sample Number	Ag	As	Cd	Cu	Hg	Pb	Se	Zn
6/16/2015	061615TRMDVJ6	<0.02	1.5	0.37	8.2	0.035	0.54	3.8	119
6/16/2015	061615TRMDVJ7	<0.02	0.5	0.46	10.5	0.025	0.08	3.2	136
6/16/2015	061615TRMDVJ8	<0.02	0.5	0.26	4.0	0.020	0.05	2.6	124
6/16/2015	061615TRMDVJ9	<0.02	2.4	0.52	8.7	0.034	0.39	3.5	154
6/16/2015	061615TRMDVJ10	<0.02	1.3	0.59	7.5	0.027	0.33	2.9	151
9/3/2015	090315TRMDVJ1	<0.02	<0.5	0.19	3.7	0.028	0.11	3.5	120
9/3/2015	090315TRMDVJ2	<0.02	<0.5	0.14	3.4	0.050	0.04	2.9	121
9/3/2015	090315TRMDVJ3	<0.02	0.6	0.20	3.2	0.036	0.12	3.0	117
9/3/2015	090315TRMDVJ4	0.04	0.8	0.22	3.4	0.054	0.06	2.4	155
9/3/2015	090315TRMDVJ5	0.03	0.5	0.18	3.4	0.098	0.07	2.0	138
9/3/2015	090315TRMDVJ6	<0.02	1.1	0.44	3.7	0.035	0.12	2.6	142
9/3/2015	090315TRMDVJ7	<0.02	0.7	0.45	4.0	0.026	0.15	2.8	130
9/3/2015	090315TRMDVJ8	0.03	<0.5	0.40	3.4	0.048	0.07	2.9	130
9/3/2015	090315TRMDVJ9	<0.02	<0.5	0.16	2.9	0.036	0.06	2.5	136
9/3/2015	090315TRMDVJ10	<0.02	0.5	0.15	3.0	0.076	0.07	2.9	125
4/24/2016	042416TRMDVJ1	<0.02	2.4	0.30	12.4	0.041	0.21	3.3	176
4/24/2016	042416TRMDVJ2	<0.02	<0.5	0.14	4.3	0.013	0.23	3.1	136

[a] Composite sample of 2 fish.

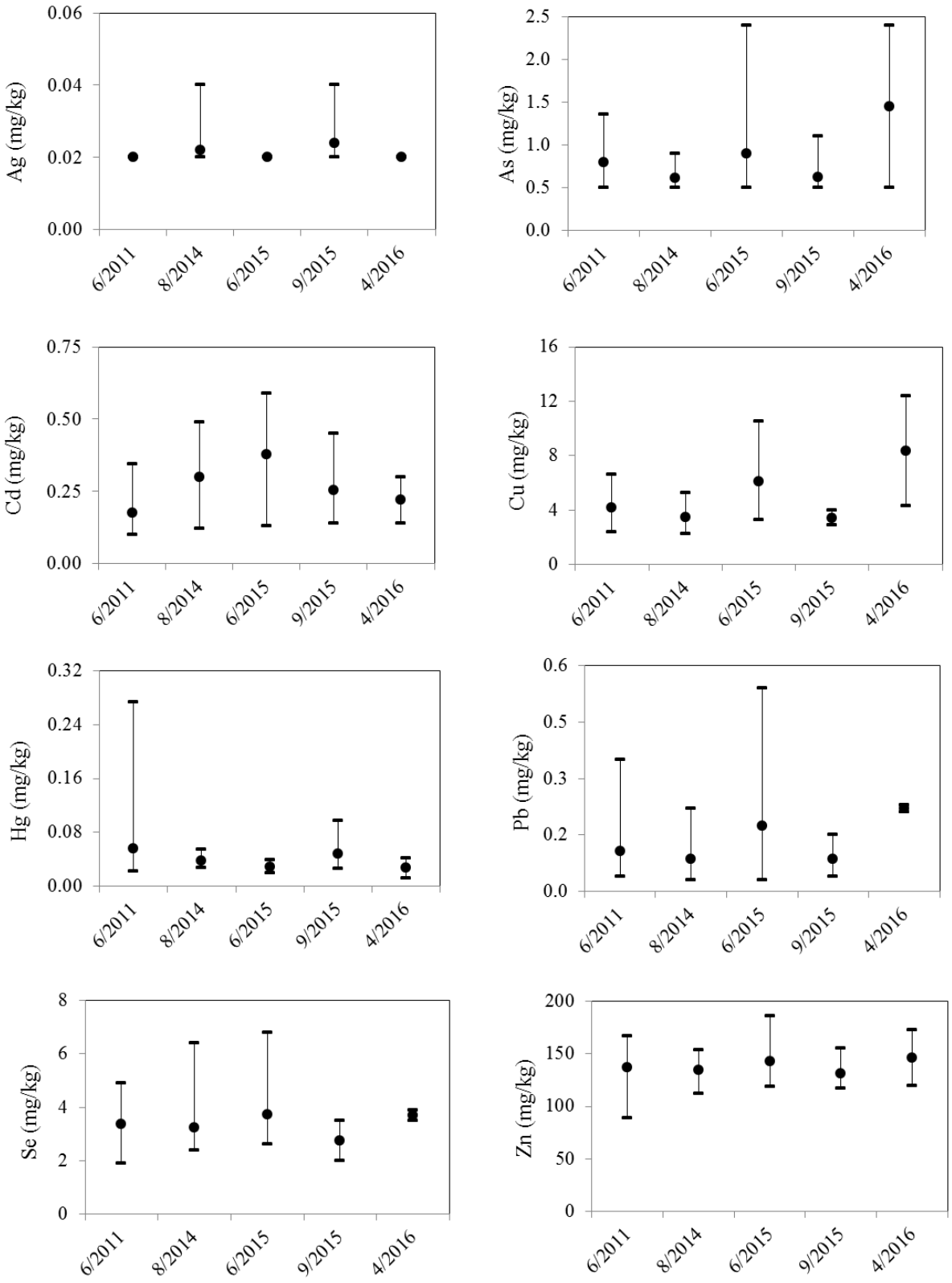

Figure 12.–TRM juvenile Dolly Varden char whole body metals concentrations.

TAKU RIVER BORDER

We submitted 20 TRB fish for laboratory analyses (Table 5; Figure 13). Dolly Varden char proved elusive at this site; we captured 1 in August 2014, 1 in June 2015, and none in September 2015. Unfortunately, in September 2015, 1 of the minnow trap lines was cut and we did not recover the trap.

Table 5.–TRB juvenile Dolly Varden char whole body metals concentrations (mg/kg).

Date	Sample Number	Ag	As	Cd	Cu	Hg	Pb	Se	Zn
6/3/2011	060311TRBDVJ7	<0.02	0.7	0.33	3.8	0.042	0.10	2.2	155
6/3/2011	060311TRBDVJ8	<0.02	1.1	0.35	4.0	0.036	0.41	4.7	109
6/3/2011	060311TRBDVJ9	<0.04	1.3	0.24	5.6	0.056	0.13	2.1	115
6/13/2011	061311TRBDVJ2	<0.02	0.8	0.13	5.8	0.065	0.09	2.6	134
6/13/2011	061311TRBDVJ3	<0.02	0.5	0.06	2.8	0.058	0.03	1.8	113
6/13/2011	061311TRBDVJ4	<0.02	0.6	0.39	3.3	0.027	0.12	2.4	131
6/13/2011	061311TRBDVJ5	<0.02	0.8	0.22	3.0	0.037	0.09	2.2	134
6/13/2011	061311TRBDVJ6	<0.02	0.7	0.14	3.1	0.048	0.11	2.5	113
6/14/2011	061411TRBDVJ1	<0.02	0.5	0.17	4.0	0.069	0.05	2.0	123
8/21/2014	082114TRBDVJ1	<0.02	1.3	0.36	3.1	0.060	0.10	2.9	143
6/16/2015	061615TRBDVJ1	<0.02	1.3	0.69	3.7	0.045	0.12	3.3	159
4/24/2016	042416TRBDVJ1	<0.02	0.6	0.28	5.2	0.037	0.27	3.5	173
4/24/2016	042416TRBDVJ2	<0.02	<0.5	0.06	2.3	0.098	<0.02	3.9	120
4/24/2016	042416TRBDVJ3	<0.02	0.5	0.10	3.1	0.053	0.02	2.3	134
4/24/2016	042416TRBDVJ4	<0.02	1.4	0.25	5.0	0.033	0.06	2.4	174
4/24/2016	042416TRBDVJ5	<0.02	1.3	0.33	5.4	0.133	0.22	2.1	147
4/24/2016	042416TRBDVJ6	<0.02	0.5	0.29	3.2	0.117	0.11	3.5	119
4/24/2016	042416TRBDVJ7	<0.02	1.1	0.31	5.0	0.057	0.12	3.0	179
4/24/2016	042416TRBDVJ8	<0.02	<0.5	0.17	3.7	0.033	0.02	2.5	132
4/24/2016	042416TRBDVJ9	<0.02	<0.5	0.17	2.4	0.015	0.10	2.1	115

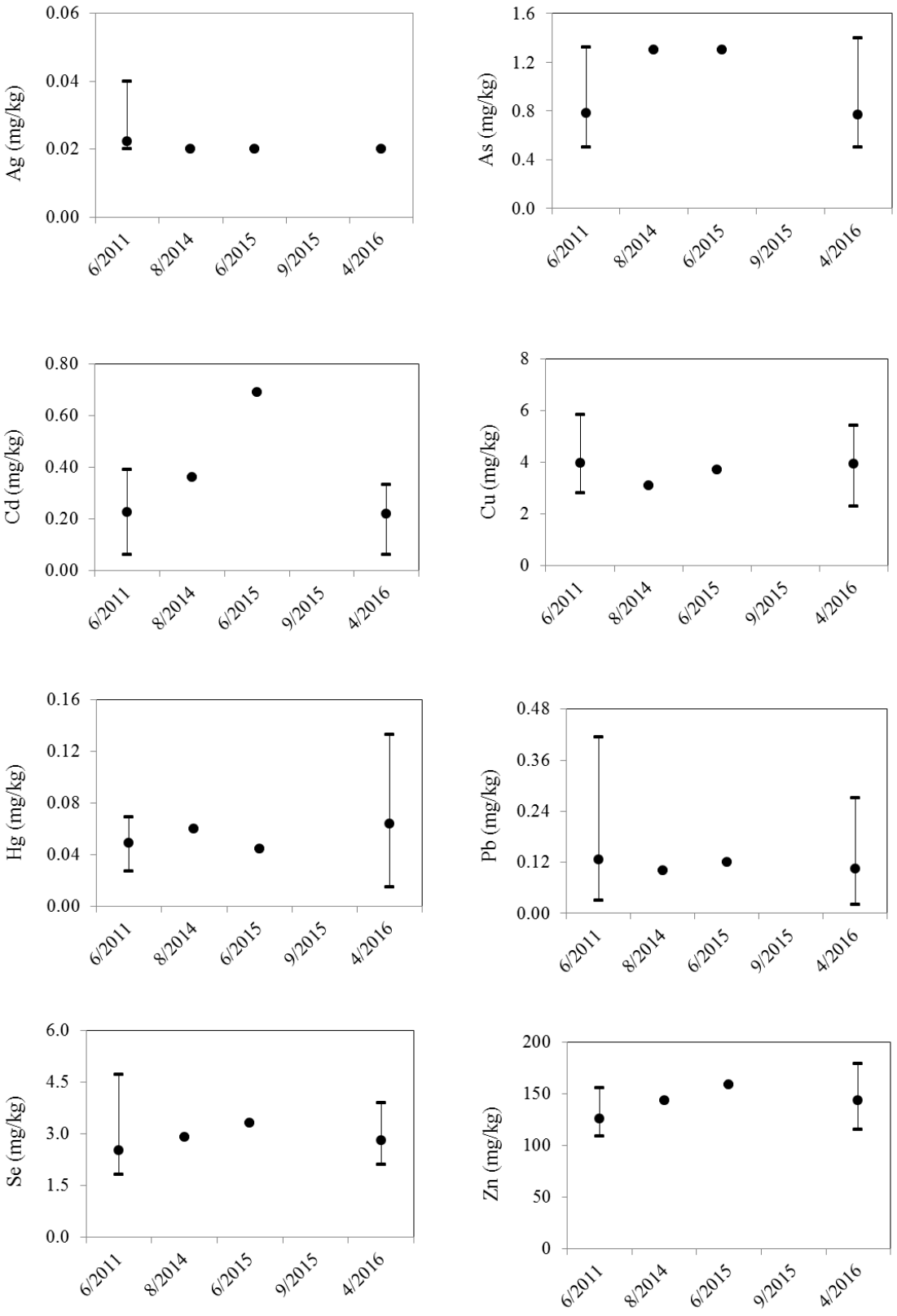

Figure 13.–TRB juvenile Dolly Varden char whole body metals concentrations.

COMPARISON AMONG SITES

Except for Se and Hg, there were no statistical differences between the UTR, TRM, and TRB pooled mean ranks of juvenile Dolly Varden char whole body metals concentrations. The mean rank of Se at TRB was lower ($p = 0.0124$) than at UTR and TRM, and at least one difference existed for Hg between the sites ($p = 0.0348$), though the Dunn's multiple comparison test did not reveal where.[5]

Since the literature does not provide reference levels above which whole body metals concentrations become a liability for salmonids, we compared the pooled mean ranks of juvenile Dolly Varden char whole body metals concentrations among UTR, TRM, and TRB with a 15-year data set (Brewster 2016a) collected upstream of the Greens Creek Mine about 92 km southwest of the Tulsequah Chief Mine (Figure 14).[6] The Greens Creek Mine mean rank for each analyte is statistically different and higher than any from UTR, TRM, and TRB.

Division of Commercial Fisheries Biometrician Kray Van Kirk graphed UTR, TRM, and TRB individual analyte concentrations for all years in a scatterplot to show the range of values we observed. Figure 15 illustrates individual fish analyte concentrations generally clustered with outliers suggesting metal attached to gills or occurring with sediments in the gut contents. Mr. Van Kirk also graphed the UTR, TRM, and TRB pooled mean analyte concentrations, showing uncertainty as one standard deviation from the mean (Figure 16). We included nondetections at the minimum detection level and find the values reasonable when compared with the statewide dataset in Appendix A.

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[5] Curious about this phenomenon, Division of Sport Fish Regional Fisheries Research Coordinator Jeff Nichols applied Waller-Duncan K-ratio and Duncan's multiple comparison tests to the Hg concentration data. The results suggest the TRM and TRB data are statistically different from each other, but the UTR is not statistically different from the other 2 sites.

[6] We do not sample for As at the Greens Creek Mine.

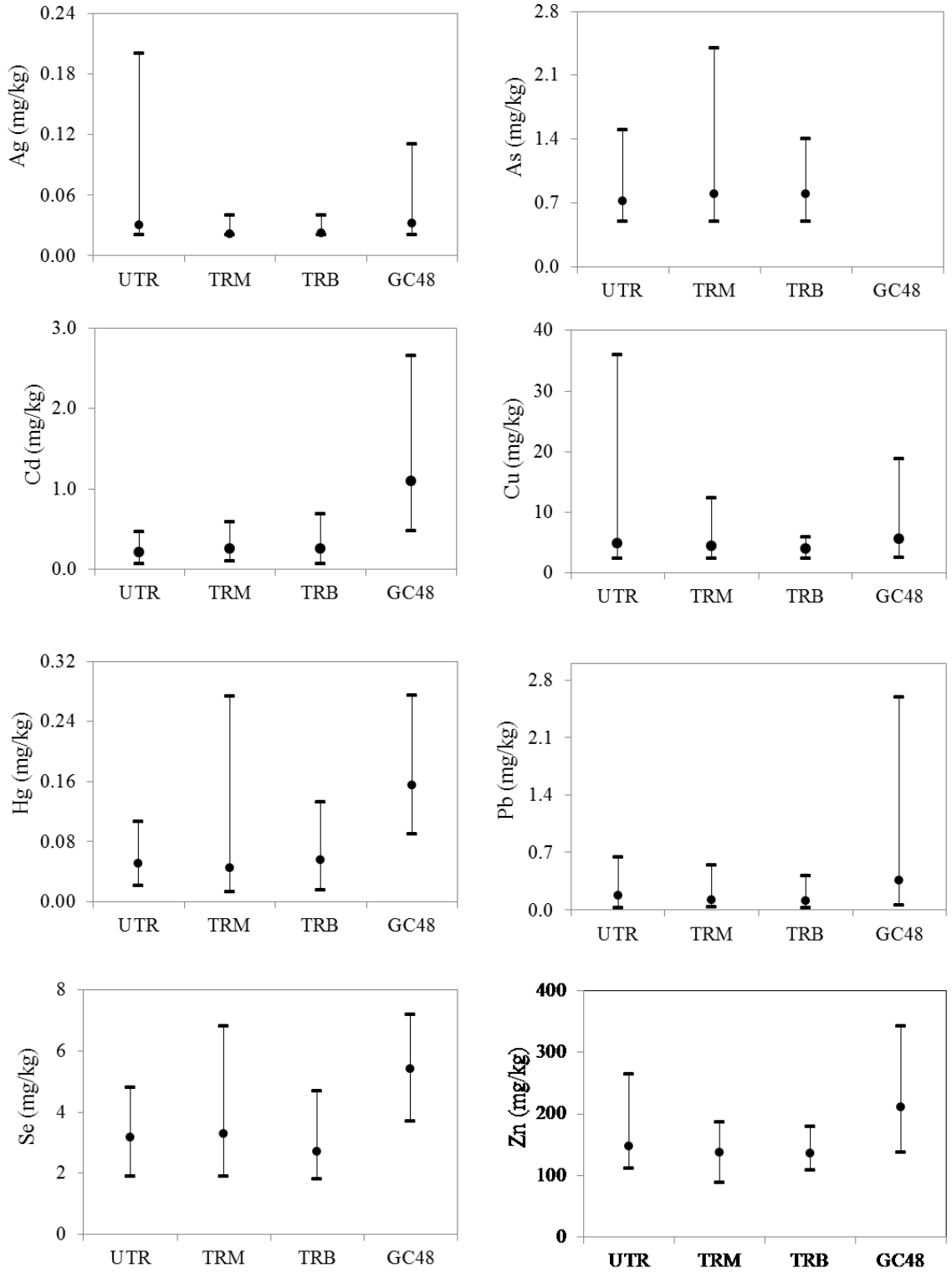

Figure 14.–UTR, TRM, TRB, and GC48 juvenile Dolly Varden char whole body metals concentrations.
Note: GC48=Greens Creek Mine above mining.

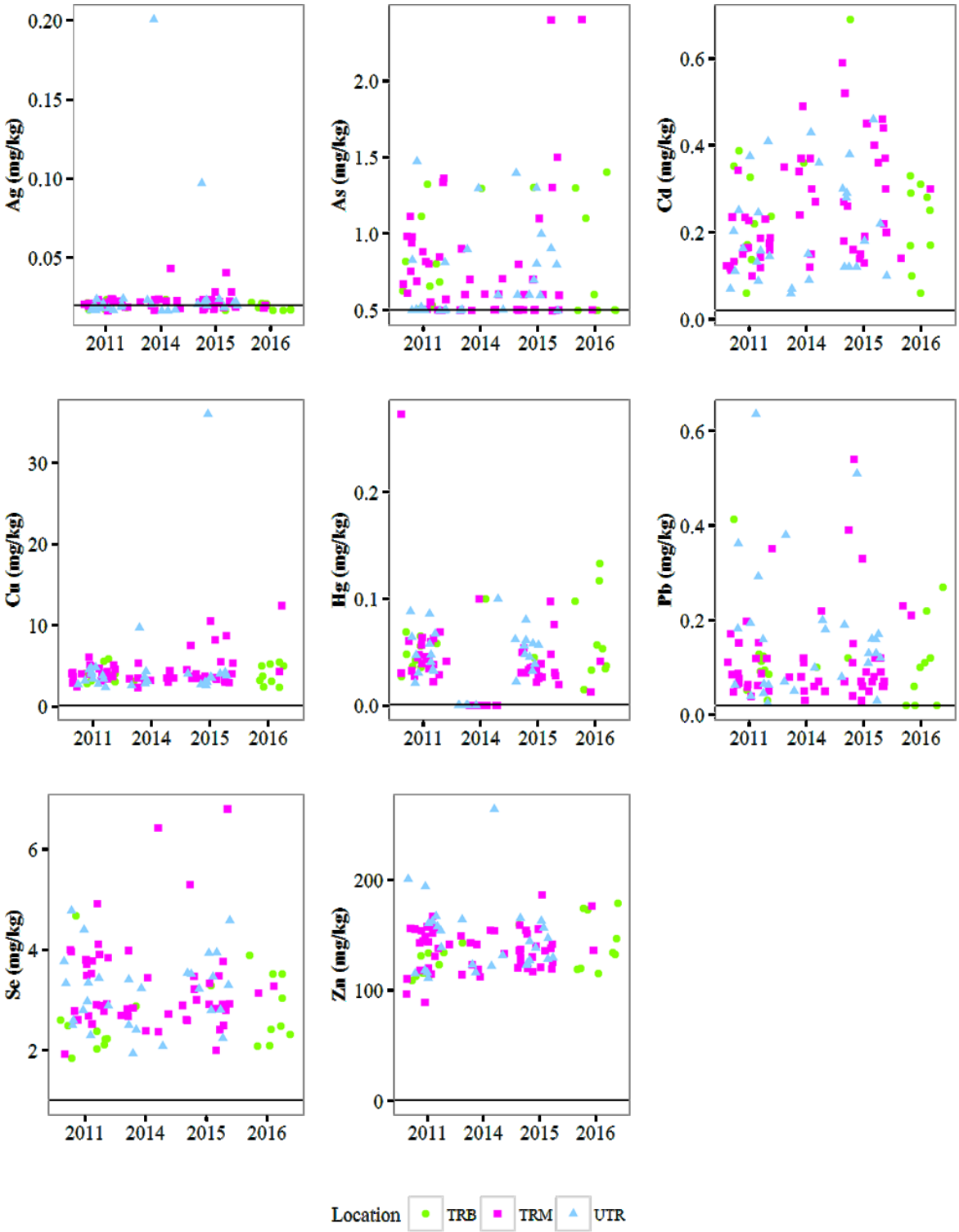

Figure 15.–UTR, TRM, and TRB individual juvenile Dolly Varden char whole body metals concentrations across years.
Note: Horizontal line in each graph defines method reporting limit.
Note: We report all nondetections at the method reporting limits.
Note: Colors match the sample sites identified in Figure 1.

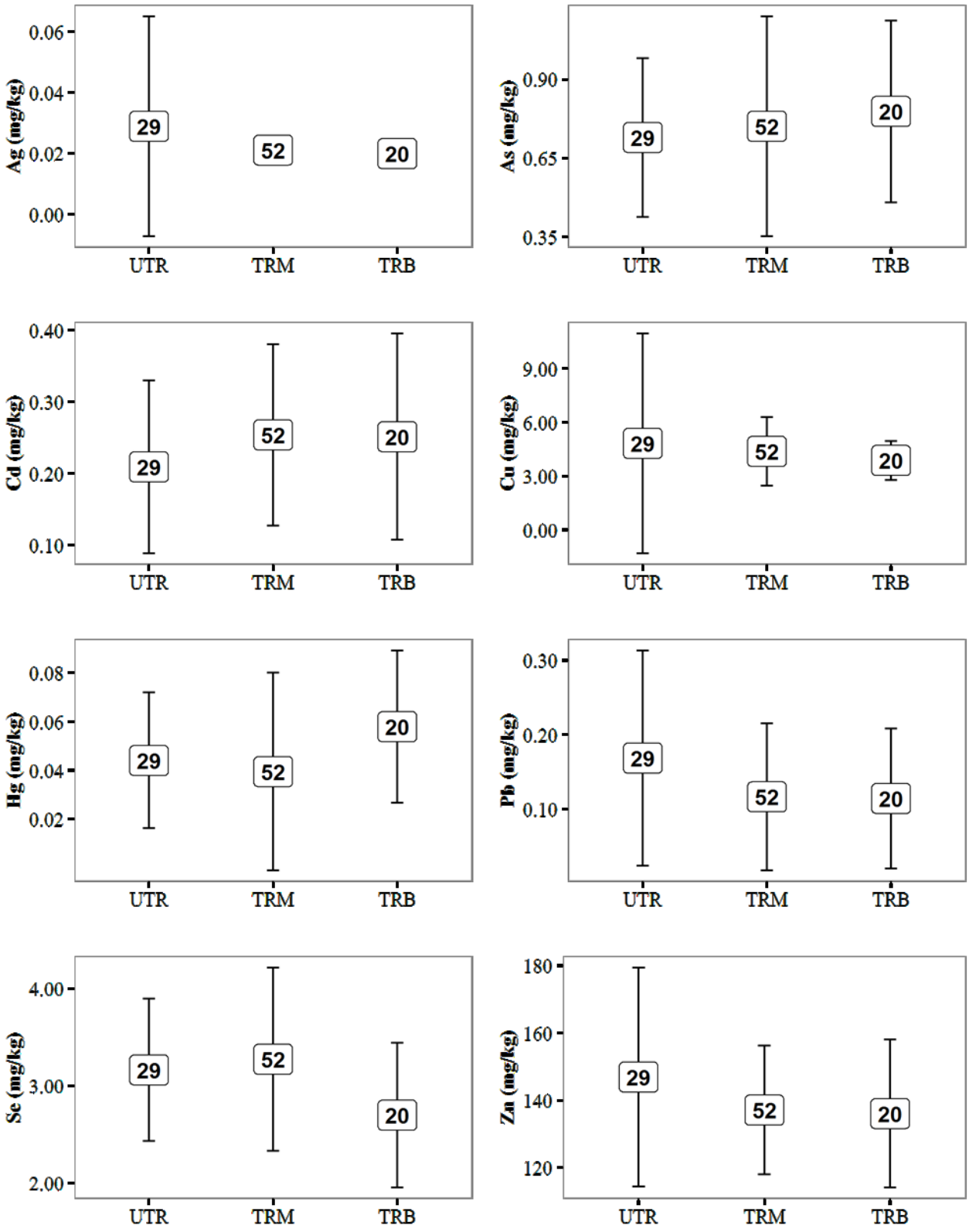

Figure 16.–UTR, TRM, and TRB sample size and pooled mean analyte concentration data ± one standard deviation.

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APPENDIX

APPENDIX A

STATEWIDE DATASET

JUVENILE DOLLY VARDEN CHAR WHOLE BODY METALS CONCENTRATIONS

Legend

Appendix A1.–Tulsequah Chief Mine data.

Appendix A2.–Pebble Prospect data.

Appendix A3.–Red Dog Mine data.

Appendix A4.–Greens Creek Mine data.

Appendix A5.–Kensington Gold Mine data.

Appendix A6.–Statewide graphs.

Appendix A7.–Statewide sampling site maps.

Legend

Site	Acronym
Tulsequah Chief Mine	
Upper Tulsequah River	UTR*
Tulsequah River Mine	TRM
Taku River Border	TRB
Pebble Prospect	
North Fork Koktuli	NFK**
South Fork Koktuli	SFK**
Upper Talarik	UT**
Red Dog Mine	
Anxiety Ridge at Haul Road	ARH
Anxiety Ridge Downstream	ARD
Anxiety Ridge Upstream	ARU*
Aufeis Downstream	AD
Aufeis North Fork	ANF*
Aufeis South Fork	ASF*
Buddy Downstream of Road	BD
Competition Lower 202	COM**
Evaingiknuk	EVA
Ferric	FER*
Grayling Junior	GJR*
Ikalukrok	IKA**
Omikviorok Downstream	OD
Omikviorok North Fork	ONF*
Omikviorok South Fork	OSF*
Red Dog Mainstem	RDM
Red Dog North Fork	RDNF
Red Dog North Fork Upstream	RDNFU*

Site	Acronym
Greens Creek Mine	
Greens Creek Site 48	GC48**
Greens Creek Site 54	GC54
Tributary Creek Site 9	TC9
Greens Creek Site 6	GC6
Kensington Gold Mine	
Lower Slate Creek	LSC
East Fork Slate Creek	EFSC
West Fork Slate Creek	WFSC*
Upper Slate Creek	USC*

*Reference

**Exploration

Metal	Symbol
Silver	Ag
Aluminum	Al
Arsenic	As
Beryllium	Be
Cadmium	Cd
Chromium	Cr
Copper	Cu
Mercury	Hg
Molybdenum	Mo
Nickel	Ni
Lead	Pb
Antimony	Sb
Selenium	Se
Thallium	Tl
Zinc	Zn

Appendix A1 Page 1 of 4.–Tulsequah Chief Mine, Upper Tulsequah River (UTR) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
6/15/2011	UTR	75	4.6	0.02	---	1.5	---	0.38	---	4.8	0.086	---	---	0.64	---	3.3	---	115
6/16/2011	UTR	100	9.2	<0.02	---	<0.5	---	0.15	---	2.8	0.033	---	---	0.07	---	4.8	---	118
6/16/2011	UTR	68	3.7	<0.04	---	<1.0	---	0.16	---	3.8	0.064	---	---	0.29	---	2.9	---	162
6/16/2011	UTR	115	13.8	0.02	---	<0.5	---	0.11	---	3.2	0.030	---	---	0.04	---	3.4	---	161
6/16/2011	UTR	111	12.6	<0.02	---	<0.5	---	0.25	---	4.0	0.034	---	---	0.06	---	3.8	---	167
6/16/2011	UTR	114	14.3	<0.02	---	0.8	---	0.41	---	4.5	0.048	---	---	0.36	---	3.3	---	158
6/16/2011	UTR	79	4.0	<0.02	---	<0.5	---	0.16	---	2.7	0.088	---	---	0.06	---	2.8	---	154
6/16/2011	UTR	105	11.6	<0.02	---	0.8	---	0.13	---	3.4	0.041	---	---	0.16	---	4.4	---	116
6/16/2011	UTR	124	18.1	<0.02	---	0.5	---	0.09	---	3.4	0.021	---	---	0.19	---	2.3	---	139
6/16/2011	UTR	113	14.6	<0.02	---	<0.5	---	0.20	---	4.2	0.047	---	---	0.03	---	3.0	---	194
6/16/2011	UTR	124	15.4	<0.02	---	<0.5	---	0.25	---	4.7	0.058	---	---	0.18	---	2.6	---	201
6/16/2011	UTR	126	21.6	<0.02	---	<0.5	---	0.07	---	2.4	0.067	---	---	0.05	---	2.5	---	111
8/21/2014	UTR	125	19.2	<0.02	---	0.6	---	0.07	---	3.1	0.037	---	---	0.18	---	1.9	---	116
8/21/2014	UTR	125	17.1	0.20	---	<0.5	---	0.36	---	9.7	0.106	---	---	0.10	---	2.5	---	264
8/22/2014	UTR	115	18.2	<0.02	---	<0.5	---	0.06	---	2.6	0.027	---	---	0.05	---	3.4	---	123
8/22/2014	UTR	115	15.6	<0.02	---	<0.5	---	0.09	---	2.8	0.021	---	---	0.07	---	3.2	---	132
8/22/2014	UTR	107	12.6	<0.02	---	0.9	---	0.15	---	4.3	0.040	---	---	0.38	---	2.1	---	122
8/22/2014	UTR	78	5.2	<0.02	---	1.3	---	0.43	---	3.6	0.059	---	---	0.20	---	2.4	---	164
6/16/2015	UTR	110	13.3	<0.02	---	0.6	---	0.18	---	36.0	0.039	---	---	0.19	---	2.2	---	130
6/16/2015	UTR	95	8.7	<0.02	---	1.4	---	0.46	---	4.2	0.080	---	---	0.12	---	3.9	---	163
6/16/2015	UTR	115	17.5	<0.02	---	0.7	---	0.12	---	4.0	0.056	---	---	0.11	---	3.2	---	144
6/16/2015	UTR	113	13.7	<0.02	---	0.8	---	0.12	---	3.6	0.061	---	---	0.17	---	2.8	---	128
6/16/2015	UTR	85	7.1	<0.02	---	0.6	---	0.12	---	3.5	0.022	---	---	0.51	---	3.3	---	165
6/16/2015	UTR	83,65	8.1	<0.02	---	0.9	---	0.30	---	4.0	0.048	---	---	0.13	---	4.6	---	147
6/16/2015	UTR	80,63	7.3	<0.02	---	1.0	---	0.10	---	2.7	0.046	---	---	0.08	---	3.5	---	124
6/16/2015	UTR	70,63	6.5	<0.02	---	1.3	---	0.22	---	3.8	0.062	---	---	0.16	---	3.9	---	127
9/3/2015	UTR	97	8.0	<0.02	---	0.5	---	0.38	---	3.0	0.032	---	---	0.16	---	2.8	---	156
9/3/2015	UTR	115	13.7	<0.02	---	0.8	---	0.28	---	---	0.057	---	---	0.13	---	3.5	---	123
9/3/2015	UTR	110	12.3	0.10	---	0.6	---	0.29	---	2.6	0.058	---	---	0.03	---	3.5	---	138

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Appendix A1 Page 2 of 4.–Tulsequah Chief Mine, Tulsequah River Mine (TRM) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
6/16/2011	TRM	130	19.9	<0.02	---	0.6	---	0.12	---	4.0	0.041	---	---	0.06	---	2.5	---	157
6/16/2011	TRM	100	9.4	<0.02	---	0.9	---	0.34	---	5.1	0.038	---	---	0.11	---	2.9	---	149
6/16/2011	TRM	95	10.4	<0.02	---	1.3	---	0.24	---	4.7	0.035	---	---	0.17	---	4.0	---	152
6/16/2011	TRM	110	14.3	<0.02	---	1.0	---	0.16	---	4.6	0.060	---	---	0.06	---	2.7	---	154
6/16/2011	TRM	107	13.8	<0.02	---	1.1	---	0.19	---	4.0	0.060	---	---	0.12	---	4.0	---	138
6/16/2011	TRM	125	18.7	<0.02	---	<0.5	---	0.11	---	3.6	0.032	---	---	0.06	---	2.8	---	110
6/16/2011	TRM	95	8.7	<0.02	---	<0.5	---	0.16	---	4.0	0.048	---	---	0.09	---	3.8	---	143
6/16/2011	TRM	105	11.9	<0.02	---	0.8	---	0.16	---	6.0	0.046	---	---	0.05	---	4.1	---	144
6/16/2011	TRM	110	12.1	<0.02	---	0.6	---	0.13	---	3.4	0.022	---	---	0.05	---	2.6	---	120
6/16/2011	TRM	110.0	13.7	<0.02	---	0.8	---	0.10	---	3.6	0.273	---	---	0.20	---	1.9	---	167
6/16/2011	TRM	120	15.4	<0.02	---	0.6	---	0.17	---	4.3	0.043	---	---	0.09	---	2.9	---	131
6/16/2011	TRM	93	8.3	<0.02	---	0.9	---	0.19	---	2.9	0.069	---	---	0.12	---	4.9	---	97
6/16/2011	TRM	122	19.3	<0.02	---	0.8	---	0.18	---	4.0	0.057	---	---	0.15	---	3.8	---	155
6/16/2011	TRM	105	12.4	<0.02	---	<0.5	---	0.12	---	2.4	0.039	---	---	0.04	---	3.7	---	89
6/16/2011	TRM	110	14.1	<0.02	---	1.4	---	0.23	---	5.1	0.028	---	---	0.35	---	3.5	---	118
6/16/2011	TRM	113	14.0	<0.02	---	1.0	---	0.23	---	4.9	0.063	---	---	0.07	---	3.5	---	156
6/16/2011	TRM	125	19.9	<0.02	---	0.9	---	0.24	---	4.1	0.064	---	---	0.15	---	3.9	---	156
6/16/2011	TRM	112	13.4	<0.02	---	<0.5	---	0.12	---	3.2	0.030	---	---	0.06	---	2.9	---	115
6/16/2011	TRM	125	20.0	<0.02	---	0.7	---	0.15	---	3.4	0.045	---	---	0.08	---	3.8	---	145
6/16/2011	TRM	115	14.5	<0.02	---	0.7	---	0.14	---	3.9	0.029	---	---	0.09	---	2.8	---	141
8/21/2014	TRM	93	8.5	<0.02	---	<0.5	---	0.35	---	3.2	0.033	---	---	0.05	---	2.7	---	149
8/21/2014	TRM	83/57	7.4	<0.02	---	0.6	---	0.37	---	3.0	0.037	---	---	0.08	---	4.0	---	123
8/21/2014	TRM	95	8.2	<0.02	---	<0.5	---	0.27	---	4.4	0.044	---	---	0.08	---	2.7	---	154
8/21/2014	TRM	96	7.2	<0.02	---	0.6	---	0.24	---	3.4	0.035	---	---	0.12	---	2.7	---	133
8/21/2014	TRM	100	9.9	<0.02	---	0.7	---	0.15	---	2.9	0.027	---	---	0.05	---	2.4	---	141
8/21/2014	TRM	107	11.2	<0.02	---	<0.5	---	0.12	---	2.3	0.054	---	---	0.03	---	2.4	---	114
8/21/2014	TRM	88	6.9	<0.02	---	0.6	---	0.30	---	3.5	0.043	---	---	0.11	---	3.4	---	119
8/21/2014	TRM	70/56	6.0	<0.02	---	0.9	---	0.37	---	5.3	0.037	---	---	0.22	---	2.8	---	154
8/21/2014	TRM	80/64	8.1	<0.02	---	0.7	---	0.49	---	3.5	0.041	---	---	0.06	---	2.8	---	112
8/21/2014	TRM	77	5.3	0.04	---	0.5	---	0.34	---	3.5	0.028	---	---	0.07	---	6.4	---	143

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Appendix A1 Page 3 of 4.–Tulsequah Chief Mine, Tulsequah River Mine (TRM) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
6/16/2015	TRM	105	12.5	<0.02	---	0.5	---	0.36	---	4.5	0.031	---	---	0.09	---	2.8	---	140
6/16/2015	TRM	120	15.1	<0.02	---	0.5	---	0.30	---	5.3	0.031	---	---	0.06	---	3.3	---	159
6/16/2015	TRM	100	10.2	<0.02	---	0.6	---	0.27	---	3.5	0.031	---	---	0.07	---	5.3	---	120
6/16/2015	TRM	88	6.6	<0.02	---	0.6	---	0.13	---	3.3	0.022	---	---	0.03	---	6.8	---	137
6/16/2015	TRM	90	6.9	<0.02	---	0.6	---	0.52	---	5.5	0.039	---	---	0.09	---	2.9	---	186
6/16/2015	TRM	115	14.9	<0.02	---	1.5	---	0.37	---	8.2	0.035	---	---	0.54	---	3.8	---	119
6/16/2015	TRM	90	8.8	<0.02	---	0.5	---	0.46	---	10.5	0.025	---	---	0.08	---	3.2	---	136
6/16/2015	TRM	112	11.2	<0.02	---	0.5	---	0.26	---	4.0	0.020	---	---	0.05	---	2.6	---	124
6/16/2015	TRM	105	11.8	<0.02	---	2.4	---	0.52	---	8.7	0.034	---	---	0.39	---	3.5	---	154
6/16/2015	TRM	115	15.1	<0.02	---	1.3	---	0.59	---	7.5	0.027	---	---	0.33	---	2.9	---	151
9/3/2015	TRM	128	18.3	<0.02	---	<0.5	---	0.19	---	3.7	0.028	---	---	0.11	---	3.5	---	120
9/3/2015	TRM	110	12.7	<0.02	---	<0.5	---	0.14	---	3.4	0.050	---	---	0.04	---	2.9	---	121
9/3/2015	TRM	125	17.3	<0.02	---	0.6	---	0.20	---	3.2	0.036	---	---	0.12	---	3.0	---	117
9/3/2015	TRM	105	11.1	0.04	---	0.8	---	0.22	---	3.4	0.054	---	---	0.06	---	2.4	---	155
9/3/2015	TRM	132	20.5	0.03	---	0.5	---	0.18	---	3.4	0.098	---	---	0.07	---	2.0	---	138
9/3/2015	TRM	108	12.2	<0.02	---	1.1	---	0.44	---	3.7	0.035	---	---	0.12	---	2.6	---	142
9/3/2015	TRM	102	10.4	<0.02	---	0.7	---	0.45	---	4.0	0.026	---	---	0.15	---	2.8	---	130
9/3/2015	TRM	105	11.1	0.03	---	<0.5	---	0.40	---	3.4	0.048	---	---	0.07	---	2.9	---	130
9/3/2015	TRM	100	9.2	<0.02	---	<0.5	---	0.16	---	2.9	0.036	---	---	0.06	---	2.5	---	136
9/3/2015	TRM	90	6.6	<0.02	---	0.5	---	0.15	---	3.0	0.076	---	---	0.07	---	2.9	---	125
4/24/2016	TRM	80	5.6	<0.02	---	2.4	---	0.30	---	12.4	0.041	---	---	0.21	---	3.3	---	176
4/24/2016	TRM	85	6.6	<0.02	---	<0.5	---	0.14	---	4.3	0.013	---	---	0.23	---	3.1	---	136

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Appendix A1 Page 4 of 4.–Tulsequah Chief Mine, Taku River Border (TRB) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
6/3/2011	TRB	100	8.1	<0.02	---	0.7	---	0.33	---	3.8	0.042	---	---	0.10	---	2.2	---	155
6/13/2011	TRB	135	23.6	<0.02	---	0.8	---	0.13	---	5.8	0.065	---	---	0.09	---	2.6	---	134
6/14/2011	TRB	100	10.0	<0.02	---	0.5	---	0.17	---	4.0	0.069	---	---	0.05	---	2.0	---	123
6/3/2011	TRB	58	1.7	<0.04	---	1.3	---	0.24	---	5.6	0.056	---	---	0.13	---	2.1	---	115
6/13/2011	TRB	145	18.6	<0.02	---	0.8	---	0.22	---	3.0	0.037	---	---	0.09	---	2.2	---	134
6/13/2011	TRB	114	14.9	<0.02	---	0.7	---	0.14	---	3.1	0.048	---	---	0.11	---	2.5	---	113
6/13/2011	TRB	170	40.8	<0.02	---	0.5	---	0.06	---	2.8	0.058	---	---	0.03	---	1.8	---	113
6/13/2011	TRB	75	4.5	<0.02	---	0.6	---	0.39	---	3.3	0.027	---	---	0.12	---	2.4	---	131
6/3/2011	TRB	80	5.1	<0.02	---	1.1	---	0.35	---	4.0	0.036	---	---	0.41	---	4.7	---	109
8/21/2014	TRB	122	19.4	<0.02	---	1.3	---	0.36	---	3.1	0.060	---	---	0.10	---	2.9	---	143
6/16/2015	TRB	120	17.9	<0.02	---	1.3	---	0.69	---	3.7	0.045	---	---	0.12	---	3.3	---	159
4/24/2016	TRB	100	9.1	<0.02	---	0.6	---	0.28	---	5.2	0.037	---	---	0.27	---	3.5	---	173
4/24/2016	TRB	155	33.1	<0.02	---	<0.5	---	0.06	---	2.3	0.098	---	---	<0.02	---	3.9	---	120
4/24/2016	TRB	155	30.6	<0.02	---	0.5	---	0.10	---	3.1	0.053	---	---	0.02	---	2.3	---	134
4/24/2016	TRB	130	21.4	<0.02	---	1.4	---	0.25	---	5.0	0.033	---	---	0.06	---	2.4	---	174
4/24/2016	TRB	120	15.9	<0.02	---	1.3	---	0.33	---	5.4	0.133	---	---	0.22	---	2.1	---	147
4/24/2016	TRB	110	14.1	<0.02	---	0.5	---	0.29	---	3.2	0.117	---	---	0.11	---	3.5	---	119
4/24/2016	TRB	95	9.9	<0.02	---	1.1	---	0.31	---	5.0	0.057	---	---	0.12	---	3.0	---	179
4/24/2016	TRB	95	9.8	<0.02	---	<0.5	---	0.17	---	3.7	0.033	---	---	0.02	---	2.5	---	132
4/24/2016	TRB	70	3.8	<0.02	---	<0.5	---	0.17	---	2.4	0.015	---	---	0.10	---	2.1	---	115

Appendix A2 Page 1 of 2.–Pebble Prospect, North Fork Koktuli (NFK) and South Fork Koktuli (SFK) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/31/2010	NFK	130	21.5	<0.02	---	0.29	<0.020	0.012	0.4	3.1	0.147	0.07	0.40	0.02	<0.050	2.3	0.011	102
8/31/2010	NFK	128	18.4	<0.02	---	0.29	<0.020	0.022	0.7	7.1	0.146	0.07	0.72	0.05	<0.050	2.5	0.015	128
8/31/2010	NFK	105	11.1	<0.02	---	0.34	0.014	0.036	0.4	3.6	0.141	0.10	0.94	0.12	0.090	3.4	0.045	135
8/31/2010	NFK	120	14.6	<0.02	---	0.45	0.013	0.027	1.4	4.0	0.096	0.10	0.96	0.19	<0.050	3.0	0.016	137
8/31/2010	NFK	105	9.5	<0.02	---	1.52	0.032	0.026	3.2	6.7	0.094	0.22	1.75	0.25	<0.050	3.0	0.019	160
8/31/2010	NFK	120	14.5	<0.02	---	1.13	0.040	0.024	8.4	5.4	0.117	0.24	2.69	0.34	<0.050	2.1	0.026	122
8/31/2010	NFK	120	16.3	0.03	---	1.22	0.049	0.039	13.9	6.9	0.107	0.34	5.36	1.02	0.055	2.4	0.029	85
8/31/2010	NFK	107	10.1	<0.02	---	0.17	<0.020	0.019	2.4	4.4	0.085	0.08	1.38	0.06	<0.050	2.2	0.014	112
8/31/2010	NFK	115	14.5	<0.02	---	0.96	0.037	0.020	17.5	4.2	0.121	0.39	6.77	0.52	<0.050	2.4	0.019	97
8/31/2010	NFK	118	13.5	0.02	---	2.20	0.086	0.047	12.1	9.5	0.093	0.34	3.51	0.91	0.087	1.9	0.040	94
8/31/2010	NFK	125	17.4	0.02	---	2.25	0.071	0.031	9.4	5.2	0.104	0.37	2.71	0.70	<0.050	1.6	0.024	87
8/31/2010	NFK	104	10.0	<0.02	---	2.22	0.090	0.049	9.1	6.6	0.095	0.23	3.35	0.36	<0.050	3.3	0.036	102
8/31/2010	NFK	105	10.5	<0.02	---	0.85	0.045	0.028	3.8	4.7	0.096	0.21	2.03	0.42	<0.050	2.9	0.031	99
8/31/2010	NFK	112	12.9	<0.02	---	0.78	0.035	0.020	16.5	5.6	0.09	0.84	3.12	0.20	<0.050	2.0	0.025	79
8/30/2010	SFK	135	22.1	<0.02	---	1.06	0.027	0.115	5.4	6.7	0.055	0.45	1.41	0.68	<0.050	3.7	0.025	97
8/30/2010	SFK	114	12.3	<0.02	---	0.33	<0.020	0.174	1.0	4.6	0.052	0.26	0.95	0.08	<0.050	3.8	0.023	104
8/30/2010	SFK	136	22.5	<0.02	---	1.79	0.035	0.177	12.6	14.2	0.038	0.61	4.48	1.95	<0.050	2.7	0.030	108
8/30/2010	SFK	135	22.4	<0.02	---	0.62	0.013	0.076	2.8	6.1	0.048	0.26	1.16	0.25	<0.050	4.8	0.027	108
8/30/2010	SFK	144	28.1	<0.02	---	1.71	0.039	0.149	16.4	9.2	0.042	0.74	4.93	1.38	<0.050	4.1	0.039	98
8/30/2010	SFK	126	18.5	0.03	---	6.57	0.110	0.227	8.5	20.3	0.034	1.11	3.16	2.78	<0.050	2.0	0.068	129
8/30/2010	SFK	138	21.1	<0.02	---	1.44	0.022	0.125	1.3	9.7	0.026	0.56	1.20	0.38	0.027	3.0	0.036	121
8/30/2010	SFK	128	19.0	<0.02	---	0.77	0.015	0.222	2.6	5.1	0.043	0.18	1.39	0.64	<0.050	3.4	0.045	111
8/30/2010	SFK	138	22.1	<0.02	---	0.47	0.006	0.063	3.0	5.8	0.035	0.21	0.81	0.20	0.031	2.3	0.012	73
8/30/2010	SFK	129	18.5	<0.02	---	0.58	0.007	0.139	2.6	4.5	0.048	0.31	1.13	0.33	<0.050	4.5	0.040	108
8/30/2010	SFK	132	21.2	<0.02	---	3.32	0.110	0.298	18.1	15.1	0.085	1.54	3.72	2.28	0.151	5.0	0.063	131
8/30/2010	SFK	148	26.6	<0.02	---	0.60	0.014	0.077	3.7	5.3	0.053	0.26	1.17	0.32	<0.050	4.7	0.029	106
8/30/2010	SFK	135	20.9	<0.02	---	1.10	0.030	0.128	6.8	7.9	0.038	0.39	2.39	0.71	0.033	4.3	0.034	101
8/30/2010	SFK	128	18.1	<0.02	---	0.35	0.013	0.083	0.5	3.5	0.057	0.14	0.58	0.10	0.099	4.2	0.057	106
8/30/2010	SFK	118	13.5	<0.02	---	0.29	<0.020	0.079	0.2	3.9	0.012	0.07	0.43	0.03	<0.050	2.5	0.011	90

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Appendix A2 Page 2 of 2.–Pebble Prospect, Upper Talarik (UT) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
9/2/2010	UT	105	9.1	<0.02	---	0.42	0.015	0.025	2.1	3.5	0.065	0.20	1.17	0.17	0.069	0.4	0.019	111
9/2/2010	UT	110	12.5	<0.02	---	0.90	0.038	0.013	2.5	3.5	0.056	0.22	1.41	0.22	0.062	0.5	0.015	95
9/2/2010	UT	125	17.3	<0.02	---	0.53	0.008	0.015	1.3	4.0	0.095	0.13	0.77	0.10	0.025	0.8	0.016	100
9/2/2010	UT	109	11.9	<0.02	---	0.33	0.008	0.015	1.9	3.0	0.034	0.13	0.71	0.09	0.022	<1.0	0.016	94
9/2/2010	UT	106	10.2	<0.02	---	0.47	0.011	0.020	1.4	3.5	0.063	0.09	1.11	0.10	0.022	<1.0	0.019	145
9/2/2010	UT	135	22.2	<0.02	---	0.94	0.008	0.027	0.7	3.5	0.149	0.11	0.82	0.16	<0.050	2.0	0.016	95
9/2/2010	UT	125	18.1	0.02	---	0.77	0.048	0.031	16.0	5.5	0.078	0.27	4.53	0.31	0.136	<1.0	0.068	91
9/2/2010	UT	123	15.6	<0.02	---	0.13	<0.020	0.009	0.3	2.7	0.068	0.04	0.53	0.09	<0.050	1.3	0.012	86
9/2/2010	UT	135	22.6	<0.02	---	0.70	0.037	0.017	4.1	3.0	0.104	0.21	1.77	0.18	<0.050	<1.0	0.024	94
9/2/2010	UT	119	15.3	<0.02	---	1.22	0.062	0.018	15.1	4.2	0.083	0.93	2.42	0.46	<0.050	1.9	0.023	104

Appendix A3 Page 1 of 31.–Red Dog Mine, Anxiety Ridge at Haul Road (ARH) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/25/1993	ARH	131	20.0	---	---	---	---	0.26	---	---	---	---	---	1.52	---	---	---	---
8/25/1993	ARH	136	21.0	---	---	---	---	0.24	---	---	---	---	---	2.12	---	---	---	---
8/25/1993	ARH	122	17.0	---	---	---	---	0.28	---	---	---	---	---	2.51	---	---	---	---
8/25/1993	ARH	124	19.0	---	---	---	---	0.24	---	---	---	---	---	1.52	---	---	---	---
8/25/1993	ARH	126	18.0	---	---	---	---	0.20	---	---	---	---	---	0.69	---	---	---	---
8/25/1993	ARH	122	16.0	---	---	---	---	0.24	---	---	---	---	---	2.60	---	---	---	---
8/10/1998	ARH	120	---	---	---	---	---	0.14	---	---	---	---	---	1.03	---	2.9	---	---
8/10/1998	ARH	120	---	---	---	---	---	0.10	---	---	---	---	---	0.72	---	2.5	---	---
8/10/1998	ARH	118	---	---	---	---	---	0.18	---	---	---	---	---	1.33	---	5.2	---	---
8/10/1998	ARH	133	---	---	---	---	---	0.21	---	---	---	---	---	1.45	---	2.8	---	---
8/10/1998	ARH	142	---	---	---	---	---	0.15	---	---	---	---	---	1.77	---	3.1	---	---
8/10/1998	ARH	126	---	---	---	---	---	0.16	---	---	---	---	---	0.62	---	3.0	---	---
8/10/1998	ARH	140	---	---	---	---	---	0.11	---	---	---	---	---	0.17	---	5.1	---	---
8/10/1998	ARH	128	---	---	---	---	---	0.11	---	---	---	---	---	1.07	---	3.5	---	---
8/10/1998	ARH	132	---	---	---	---	---	0.15	---	---	---	---	---	0.41	---	3.6	---	---
8/10/1998	ARH	111	---	---	---	---	---	0.13	---	---	---	---	---	1.15	---	4.3	---	---
8/12/1999	ARH	125	---	---	---	---	---	0.22	---	---	---	---	---	0.42	---	5.6	---	---
8/12/1999	ARH	134	---	---	---	---	---	0.39	---	---	---	---	---	0.51	---	5.9	---	---
8/12/1999	ARH	135	---	---	---	---	---	0.18	---	---	---	---	---	0.48	---	4.6	---	---
8/12/1999	ARH	131	---	---	---	---	---	0.37	---	---	---	---	---	1.20	---	4.2	---	---
8/12/1999	ARH	137	---	---	---	---	---	0.13	---	---	---	---	---	0.27	---	4.0	---	---
8/12/1999	ARH	130	---	---	---	---	---	0.26	---	---	---	---	---	0.36	---	4.3	---	---
8/12/1999	ARH	123	---	---	---	---	---	0.34	---	---	---	---	---	1.10	---	5.2	---	---
8/12/1999	ARH	127	---	---	---	---	---	0.14	---	---	---	---	---	0.43	---	4.9	---	---
8/12/1999	ARH	123	---	---	---	---	---	0.23	---	---	---	---	---	0.68	---	4.5	---	---
8/12/1999	ARH	126	---	---	---	---	---	0.27	---	---	---	---	---	0.56	---	5.5	---	---
8/1/2000	ARH	125	16.1	---	---	---	---	0.21	---	---	---	---	---	1.36	---	3.4	---	---
8/1/2000	ARH	117	12.4	---	---	---	---	0.31	---	---	---	---	---	2.86	---	5.4	---	---
8/1/2000	ARH	124	14.2	---	---	---	---	0.31	---	---	---	---	---	2.09	---	3.9	---	---
8/1/2000	ARH	133	21.9	---	---	---	---	0.11	---	---	---	---	---	2.30	---	3.9	---	---
8/1/2000	ARH	134	18.7	---	---	---	---	0.27	---	---	---	---	---	1.20	---	4.1	---	---

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Appendix A3 Page 2 of 31.–Red Dog Mine, Anxiety Ridge at Haul Road (ARH) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/31/2005	ARH	118	15.1	---	---	---	---	0.45	---	---	0.040	---	---	0.42	---	3.8	---	126
7/31/2005	ARH	135	21.3	---	---	---	---	0.13	---	---	0.050	---	---	0.14	---	3.7	---	107
7/31/2005	ARH	102	9.3	---	---	---	---	0.26	---	---	0.050	---	---	0.22	---	7.2	---	135
7/31/2005	ARH	114	13.4	---	---	---	---	0.17	---	---	0.060	---	---	0.15	---	5.0	---	117
7/31/2005	ARH	121	16.7	---	---	---	---	0.11	---	---	0.060	---	---	0.17	---	4.1	---	129
7/31/2005	ARH	101	8.9	---	---	---	---	0.27	---	---	0.060	---	---	0.20	---	5.3	---	124
7/31/2005	ARH	119	14.8	---	---	---	---	0.10	---	---	0.070	---	---	0.06	---	4.6	---	106
7/31/2005	ARH	110	11.9	---	---	---	---	0.12	---	---	0.050	---	---	0.24	---	4.2	---	107
7/31/2005	ARH	109	11.6	---	---	---	---	0.14	---	---	0.060	---	---	0.10	---	5.2	---	114
7/31/2005	ARH	123	15.2	---	---	---	---	0.61	---	---	0.040	---	---	0.17	---	6.0	---	157
7/31/2005	ARH	114	13.0	---	---	---	---	1.75	---	---	<0.020	---	---	0.23	---	7.6	---	175
7/31/2005	ARH	113	11.7	---	---	---	---	0.19	---	---	0.080	---	---	0.26	---	5.7	---	188
7/31/2005	ARH	105	11.0	---	---	---	---	0.35	---	---	0.030	---	---	0.13	---	4.9	---	137
7/31/2005	ARH	108	10.9	---	---	---	---	0.28	---	---	0.070	---	---	0.27	---	5.1	---	168
7/31/2005	ARH	102	8.5	---	---	---	---	0.13	---	---	0.050	---	---	0.13	---	4.2	---	144
8/14/2006	ARH	120	16.7	---	---	---	---	0.57	---	---	0.100	---	---	0.78	---	3.9	---	158
8/14/2006	ARH	112	13.9	---	---	---	---	0.27	---	---	0.080	---	---	0.44	---	3.8	---	120
8/14/2006	ARH	92	7.9	---	---	---	---	0.65	---	---	0.090	---	---	1.03	---	<1.0	---	164
8/14/2006	ARH	87	6.4	---	---	---	---	0.33	---	---	0.090	---	---	0.44	---	6.1	---	169
8/14/2006	ARH	109	12.4	---	---	---	---	0.54	---	---	0.090	---	---	1.25	---	4.1	---	141
8/14/2006	ARH	90	7.2	---	---	---	---	0.32	---	---	0.090	---	---	1.36	---	3.7	---	245
8/14/2006	ARH	93	8.4	---	---	---	---	0.57	---	---	0.070	---	---	0.11	---	4.4	---	157
8/14/2006	ARH	103	10.8	---	---	---	---	0.56	---	---	0.100	---	---	1.30	---	2.9	---	147
8/14/2006	ARH	116	15.9	---	---	---	---	0.49	---	---	0.150	---	---	1.04	---	4.7	---	129
8/14/2006	ARH	90	7.7	---	---	---	---	0.31	---	---	0.050	---	---	0.45	---	3.2	---	142
8/14/2006	ARH	93	8.7	---	---	---	---	0.48	---	---	0.070	---	---	3.69	---	5.9	---	171
8/14/2006	ARH	123	19.8	---	---	---	---	0.64	---	---	0.120	---	---	0.95	---	3.7	---	155
8/14/2006	ARH	84	6.3	---	---	---	---	0.62	---	---	0.080	---	---	0.92	---	4.0	---	144

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Appendix A3 Page 3 of 31.–Red Dog Mine, Anxiety Ridge at Haul Road (ARH) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/10/2007	ARH	113	12.5	---	---	---	---	0.25	---	---	0.140	---	---	0.25	---	4.4	---	133
8/10/2007	ARH	93	7.7	---	---	---	---	0.32	---	---	0.070	---	---	0.22	---	3.1	---	94
8/10/2007	ARH	128	18.4	---	---	---	---	0.25	---	---	0.090	---	---	0.20	---	4.6	---	102
8/10/2007	ARH	132	21.0	---	---	---	---	0.29	---	---	0.100	---	---	0.27	---	3.6	---	99
8/10/2007	ARH	125	15.9	---	---	---	---	0.18	---	---	0.070	---	---	0.14	---	4.0	---	114
8/10/2007	ARH	128	18.6	---	---	---	---	0.22	---	---	0.050	---	---	0.16	---	3.6	---	141
8/10/2007	ARH	126	16.4	---	---	---	---	0.09	---	---	0.070	---	---	0.15	---	1.3	---	101
8/10/2007	ARH	128	17.6	---	---	---	---	0.21	---	---	0.050	---	---	0.38	---	3.5	---	106
8/10/2007	ARH	100	10.3	---	---	---	---	0.21	---	---	0.050	---	---	0.52	---	3.4	---	107
8/10/2007	ARH	104	10.2	---	---	---	---	0.38	---	---	0.050	---	---	1.07	---	3.2	---	114
8/10/2007	ARH	96	8.2	---	---	---	---	0.26	---	---	0.080	---	---	0.77	---	3.8	---	90
8/10/2007	ARH	103	10.2	---	---	---	---	0.19	---	---	0.080	---	---	0.32	---	3.4	---	119
8/10/2007	ARH	129	18.7	---	---	---	---	0.13	---	---	0.090	---	---	0.84	---	3.2	---	113
8/10/2007	ARH	102	9.3	---	---	---	---	0.19	---	---	0.080	---	---	0.14	---	3.7	---	79
8/10/2007	ARH	129	19.3	---	---	---	---	0.17	---	---	0.080	---	---	0.20	---	3.4	---	97
8/5/2008	ARH	94	6.6	---	---	---	---	0.18	---	---	0.070	---	---	0.43	---	3.8	---	112
8/5/2008	ARH	101	8.8	---	---	---	---	0.17	---	---	0.060	---	---	0.09	---	4.8	---	136
8/5/2008	ARH	118	14.5	---	---	---	---	0.33	---	---	0.090	---	---	0.26	---	5.5	---	121
8/5/2008	ARH	95	6.8	---	---	---	---	0.18	---	---	0.060	---	---	0.31	---	4.1	---	124
8/5/2008	ARH	122	14.0	---	---	---	---	0.12	---	---	0.120	---	---	0.07	---	1.9	---	139
8/5/2008	ARH	98	8.2	---	---	---	---	0.14	---	---	0.070	---	---	0.18	---	3.6	---	122
8/5/2008	ARH	94	7.1	---	---	---	---	0.15	---	---	0.090	---	---	0.52	---	3.2	---	150
8/5/2008	ARH	100	8.8	---	---	---	---	0.11	---	---	0.070	---	---	0.13	---	3.6	---	161
8/5/2008	ARH	103	9.4	---	---	---	---	0.19	---	---	0.100	---	---	0.21	---	3.8	---	126
8/5/2008	ARH	93	6.9	---	---	---	---	0.20	---	---	0.080	---	---	0.22	---	4.2	---	114
8/5/2008	ARH	101	8.0	---	---	---	---	0.19	---	---	0.070	---	---	0.39	---	5.6	---	120
8/5/2008	ARH	93	6.4	---	---	---	---	0.26	---	---	0.070	---	---	0.12	---	4.8	---	109
8/5/2008	ARH	90	6.2	---	---	---	---	0.21	---	---	0.060	---	---	0.21	---	4.0	---	142
8/5/2008	ARH	94	6.7	---	---	---	---	0.28	---	---	0.070	---	---	0.37	---	3.9	---	176
8/5/2008	ARH	104	7.8	---	---	---	---	0.30	---	---	0.260	---	---	0.59	---	5.3	---	199

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Appendix A3 Page 4 of 31.–Red Dog Mine, Anxiety Ridge at Haul Road (ARH) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/31/2009	ARH	94	6.6	---	---	---	---	0.32	---	---	0.090	---	---	0.62	---	5.9	---	109
7/31/2009	ARH	101	8.8	---	---	---	---	0.16	---	---	0.100	---	---	1.02	---	5.3	---	155
7/31/2009	ARH	118	14.5	---	---	---	---	0.21	---	---	0.090	---	---	0.35	---	6.6	---	117
7/31/2009	ARH	95	6.8	---	---	---	---	0.33	---	---	0.150	---	---	0.68	---	5.5	---	139
7/31/2009	ARH	122	14.0	---	---	---	---	0.19	---	---	0.070	---	---	0.47	---	5.7	---	129
7/31/2009	ARH	98	8.2	---	---	---	---	0.15	---	---	0.140	---	---	1.42	---	4.5	---	125
7/31/2009	ARH	94	7.1	---	---	---	---	0.12	---	---	0.110	---	---	0.31	---	4.1	---	118
7/31/2009	ARH	100	8.8	---	---	---	---	0.11	---	---	0.080	---	---	0.37	---	5.2	---	98
7/31/2009	ARH	103	9.4	---	---	---	---	0.24	---	---	0.090	---	---	0.98	---	4.3	---	153
7/31/2009	ARH	93	6.9	---	---	---	---	0.10	---	---	0.110	---	---	0.55	---	4.6	---	139
7/31/2009	ARH	101	8.0	---	---	---	---	0.18	---	---	0.070	---	---	0.47	---	5.5	---	117
7/31/2009	ARH	93	6.4	---	---	---	---	0.19	---	---	0.090	---	---	0.71	---	7.1	---	126
7/31/2009	ARH	90	6.2	---	---	---	---	0.19	---	---	0.150	---	---	0.63	---	4.8	---	131
7/31/2009	ARH	94	6.7	---	---	---	---	0.13	---	---	0.110	---	---	0.36	---	4.0	---	133
7/31/2009	ARH	104	7.8	---	---	---	---	0.11	---	---	0.080	---	---	0.62	---	4.8	---	111
8/16/2010	ARH	133	22.5	---	---	---	---	0.23	---	---	0.080	---	---	0.98	---	4.1	---	127
8/16/2010	ARH	107	12.3	---	---	---	---	0.21	---	---	0.050	---	---	0.83	---	4.0	---	108
8/16/2010	ARH	116	15.5	---	---	---	---	0.12	---	---	0.080	---	---	1.64	---	4.6	---	104
8/16/2010	ARH	122	17.0	---	---	---	---	0.17	---	---	0.080	---	---	0.42	---	4.3	---	98
8/16/2010	ARH	121	18.0	---	---	---	---	0.22	---	---	0.070	---	---	0.34	---	3.1	---	90
8/16/2010	ARH	120	17.3	---	---	---	---	0.05	---	---	0.050	---	---	0.12	---	3.4	---	83
8/16/2010	ARH	123	19.0	---	---	---	---	0.10	---	---	0.060	---	---	0.18	---	3.4	---	115
8/16/2010	ARH	122	15.8	---	---	---	---	0.12	---	---	0.070	---	---	0.54	---	3.2	---	114
8/16/2010	ARH	97	8.3	---	---	---	---	0.17	---	---	0.040	---	---	0.19	---	3.6	---	97
8/16/2010	ARH	141	24.3	---	---	---	---	0.13	---	---	0.070	---	---	0.56	---	4.0	---	89

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Appendix A3 Page 5 of 31.–Red Dog Mine, Anxiety Ridge at Haul Road (ARH) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/27/2011	ARH	138	27.5	---	---	---	---	0.19	---	---	0.070	---	---	0.16	---	3.5	---	96
8/27/2011	ARH	103	11.0	---	---	---	---	0.14	---	---	0.070	---	---	0.22	---	3.8	---	96
8/27/2011	ARH	118	15.0	---	---	---	---	0.13	---	---	0.080	---	---	0.47	---	3.4	---	99
8/27/2011	ARH	138	26.5	---	---	---	---	0.18	---	---	0.060	---	---	0.46	---	3.7	---	94
8/27/2011	ARH	127	20.0	---	---	---	---	0.22	---	---	0.060	---	---	0.18	---	3.1	---	78
8/27/2011	ARH	125	18.0	---	---	---	---	0.20	---	---	0.060	---	---	1.24	---	3.8	---	107
8/27/2011	ARH	131	23.0	---	---	---	---	0.14	---	---	0.070	---	---	0.88	---	3.3	---	83
8/27/2011	ARH	112	12.0	---	---	---	---	0.39	---	---	0.040	---	---	0.09	---	4.8	---	78
8/27/2011	ARH	110	12.5	---	---	---	---	0.10	---	---	0.070	---	---	0.27	---	3.7	---	88
8/27/2011	ARH	130	18.5	---	---	---	---	0.33	---	---	0.040	---	---	0.06	---	5.6	---	88
8/27/2011	ARH	140	24.5	---	---	---	---	0.23	---	---	0.040	---	---	2.12	---	4.2	---	105
8/27/2011	ARH	136	25.0	---	---	---	---	0.51	---	---	0.050	---	---	0.41	---	5.5	---	85
8/27/2011	ARH	130	19.5	---	---	---	---	0.17	---	---	0.070	---	---	0.30	---	4.2	---	129
8/27/2011	ARH	95	9.0	---	---	---	---	0.09	---	---	0.070	---	---	0.10	---	2.9	---	86
8/27/2011	ARH	94	8.0	---	---	---	---	0.08	---	---	0.070	---	---	0.12	---	3.3	---	95
8/2/2014	ARH	87	7.5	---	---	---	---	0.83	---	4.6	0.050	---	---	1.20	---	6.0	---	127
8/2/2014	ARH	110	12.5	---	---	---	---	0.18	---	3.1	0.090	---	---	0.91	---	6.0	---	97
8/2/2014	ARH	94	7.0	---	---	---	---	0.18	---	3.4	0.040	---	---	0.63	---	6.3	---	126
8/2/2014	ARH	125	18.0	---	---	---	---	0.22	---	3.7	0.100	---	---	1.18	---	5.1	---	125
8/2/2014	ARH	109	13.0	---	---	---	---	0.70	---	3.8	0.040	---	---	0.43	---	5.7	---	128
8/2/2014	ARH	93	9.0	---	---	---	---	0.32	---	2.9	0.080	---	---	0.25	---	6.3	---	111
8/2/2014	ARH	128	17.5	---	---	---	---	0.20	---	3.4	0.080	---	---	1.01	---	5.5	---	112

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Appendix A3 Page 6 of 31.–Red Dog Mine, Anxiety Ridge at Haul Road (ARH) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/31/2015	ARH	101	12.0	---	---	---	---	0.18	---	3.4	0.070	---	---	0.62	---	5.3	---	159
7/31/2015	ARH	94	9.0	---	---	---	---	0.87	---	4.4	0.060	---	---	0.24	---	7.0	---	141
7/31/2015	ARH	93	8.5	---	---	---	---	0.91	---	4.1	0.050	---	---	0.45	---	8.2	---	130
7/31/2015	ARH	95	8.5	---	---	---	---	0.49	---	3.9	0.040	---	---	0.19	---	5.5	---	141
7/31/2015	ARH	123	17.5	---	---	---	---	0.20	---	4.1	0.080	---	---	0.31	---	6.8	---	150
7/31/2015	ARH	96	9.5	---	---	---	---	0.21	---	3.7	0.070	---	---	0.12	---	6.5	---	130
7/31/2015	ARH	101	10.5	---	---	---	---	0.34	---	3.5	0.050	---	---	0.32	---	5.8	---	123
7/31/2015	ARH	103	11.0	---	---	---	---	0.34	---	3.2	0.040	---	---	0.20	---	6.7	---	130
7/31/2015	ARH	102	12.0	---	---	---	---	0.21	---	3.1	0.050	---	---	0.24	---	5.7	---	130
7/31/2015	ARH	104	12.5	---	---	---	---	0.41	---	2.9	0.070	---	---	0.08	---	6.8	---	123
7/31/2015	ARH	95	9.5	---	---	---	---	0.31	---	3.5	0.060	---	---	0.48	---	5.7	---	133
7/31/2015	ARH	99	9.5	---	---	---	---	0.31	---	2.7	0.050	---	---	0.11	---	5.9	---	123
7/31/2015	ARH	97	9.5	---	---	---	---	0.13	---	2.4	0.040	---	---	0.09	---	4.6	---	123
7/31/2015	ARH	123	17.5	---	---	---	---	0.25	---	4.0	0.070	---	---	0.19	---	6.9	---	131
7/31/2015	ARH	116	13.5	---	---	---	---	0.13	---	4.2	0.050	---	---	0.55	---	5.0	---	145

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Appendix A3 Page 7 of 31.–Red Dog Mine, Anxiety Ridge Downstream (ARD) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/4/2002	ARD	139	26.4	---	---	---	---	0.36	---	---	---	---	---	0.21	---	4.3	---	107
8/4/2002	ARD	114	14.3	---	---	---	---	0.54	---	---	---	---	---	0.23	---	8.5	---	102
8/4/2002	ARD	107	12.1	---	---	---	---	0.81	---	---	---	---	---	0.32	---	5.2	---	120
8/4/2002	ARD	135	22.9	---	---	---	---	0.25	---	---	---	---	---	0.32	---	4.4	---	113
8/4/2002	ARD	95	9.9	---	---	---	---	0.37	---	---	---	---	---	0.24	---	5.0	---	99
8/4/2002	ARD	90	8.7	---	---	---	---	1.32	---	---	---	---	---	0.35	---	5.8	---	121
8/4/2002	ARD	96	9.0	---	---	---	---	0.62	---	---	---	---	---	0.42	---	5.0	---	134
8/4/2002	ARD	97	9.4	---	---	---	---	0.45	---	---	---	---	---	0.22	---	5.1	---	114
8/4/2002	ARD	114	13.3	---	---	---	---	0.42	---	---	---	---	---	0.17	---	4.7	---	103
8/4/2002	ARD	136	24.0	---	---	---	---	0.16	---	---	---	---	---	0.13	---	3.7	---	127
8/4/2002	ARD	116	15.0	---	---	---	---	0.41	---	---	---	---	---	0.28	---	5.5	---	107
8/4/2002	ARD	114	13.3	---	---	---	---	0.44	---	---	---	---	---	0.20	---	5.1	---	111
8/4/2002	ARD	105	10.5	---	---	---	---	0.82	---	---	---	---	---	0.61	---	8.1	---	112
8/4/2002	ARD	104	10.4	---	---	---	---	0.61	---	---	---	---	---	0.64	---	6.8	---	134
8/4/2002	ARD	96	8.0	---	---	---	---	1.13	---	---	---	---	---	0.25	---	4.7	---	108
8/25/2004	ARD	121	14.9	---	---	---	---	0.20	---	---	0.040	---	---	0.15	---	5.7	---	146
8/25/2004	ARD	116	10.1	---	---	---	---	0.20	---	---	0.040	---	---	0.13	---	4.8	---	136
8/25/2004	ARD	109	10.8	---	---	---	---	0.16	---	---	0.030	---	---	0.09	---	6.2	---	135
8/25/2004	ARD	116	13.1	---	---	---	---	0.19	---	---	0.030	---	---	0.11	---	5.3	---	134
8/25/2004	ARD	128	18.5	---	---	---	---	0.10	---	---	0.030	---	---	0.14	---	4.4	---	119
8/25/2004	ARD	108	13.1	---	---	---	---	0.52	---	---	0.020	---	---	0.36	---	8.2	---	193
8/25/2004	ARD	111	12.3	---	---	---	---	0.26	---	---	0.030	---	---	0.11	---	5.3	---	100
8/25/2004	ARD	108	10.5	---	---	---	---	0.28	---	---	0.030	---	---	0.13	---	7.2	---	144
8/25/2004	ARD	99	9.1	---	---	---	---	0.18	---	---	0.040	---	---	0.21	---	4.5	---	138
8/25/2004	ARD	132	18.1	---	---	---	---	0.25	---	---	0.020	---	---	0.09	---	5.2	---	114
8/25/2004	ARD	119	13.4	---	---	---	---	0.28	---	---	0.050	---	---	3.23	---	5.8	---	128
8/25/2004	ARD	102	9.5	---	---	---	---	0.11	---	---	0.040	---	---	0.12	---	3.5	---	124
8/25/2004	ARD	106	10.7	---	---	---	---	0.14	---	---	0.030	---	---	0.80	---	3.4	---	136
8/25/2004	ARD	121	14.0	---	---	---	---	0.20	---	---	0.040	---	---	0.37	---	4.5	---	120
8/25/2004	ARD	112	11.7	---	---	---	---	0.41	---	---	<0.020	---	---	0.30	---	6.3	---	142

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Appendix A3 Page 8 of 31.–Red Dog Mine, Anxiety Ridge Upstream (ARU) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/4/2002	ARU	142	28.0	---	---	---	---	0.07	---	---	---	---	---	0.07	---	2.9	---	92
8/4/2002	ARU	134	22.9	---	---	---	---	0.13	---	---	---	---	---	0.23	---	4.3	---	110
8/4/2002	ARU	125	18.7	---	---	---	---	0.12	---	---	---	---	---	0.04	---	3.7	---	116
8/4/2002	ARU	98	8.3	---	---	---	---	0.33	---	---	---	---	---	0.08	---	5.9	---	89
8/4/2002	ARU	110	11.6	---	---	---	---	0.87	---	---	---	---	---	0.12	---	8.5	---	135
8/4/2002	ARU	132	23.7	---	---	---	---	0.17	---	---	---	---	---	0.42	---	2.6	---	115
8/4/2002	ARU	129	18.9	---	---	---	---	0.21	---	---	---	---	---	0.22	---	3.7	---	139
8/4/2002	ARU	122	15.6	---	---	---	---	0.11	---	---	---	---	---	0.06	---	2.8	---	135
8/4/2002	ARU	98	8.3	---	---	---	---	0.32	---	---	---	---	---	0.10	---	4.6	---	119
8/4/2002	ARU	95	8.1	---	---	---	---	0.09	---	---	---	---	---	0.05	---	4.2	---	112
8/4/2002	ARU	110	11.5	---	---	---	---	0.43	---	---	---	---	---	0.20	---	6.3	---	102
8/4/2002	ARU	97	7.2	---	---	---	---	0.19	---	---	---	---	---	0.16	---	6.2	---	108
8/4/2002	ARU	93	7.1	---	---	---	---	0.27	---	---	---	---	---	0.08	---	5.0	---	107
8/4/2002	ARU	90	6.3	---	---	---	---	0.22	---	---	---	---	---	0.05	---	3.8	---	103
8/4/2002	ARU	98	8.4	---	---	---	---	0.62	---	---	---	---	---	0.11	---	7.8	---	140
8/25/2004	ARU	101	9.6	---	---	---	---	0.17	---	---	0.050	---	---	0.09	---	3.0	---	111
8/25/2004	ARU	128	20.3	---	---	---	---	0.18	---	---	0.070	---	---	0.85	---	2.6	---	100
8/25/2004	ARU	131	21.5	---	---	---	---	0.24	---	---	0.060	---	---	1.34	---	2.6	---	103
8/25/2004	ARU	130	20.4	---	---	---	---	0.13	---	---	0.030	---	---	0.49	---	4.2	---	115
8/25/2004	ARU	128	20.9	---	---	---	---	0.23	---	---	0.050	---	---	1.53	---	2.1	---	130
8/25/2004	ARU	138	23.7	---	---	---	---	0.13	---	---	0.080	---	---	2.29	---	2.2	---	117
8/25/2004	ARU	116	13.4	---	---	---	---	0.11	---	---	0.070	---	---	0.22	---	1.8	---	141
8/25/2004	ARU	109	11.4	---	---	---	---	0.33	---	---	0.030	---	---	0.47	---	4.6	---	155
8/25/2004	ARU	95	8.2	---	---	---	---	0.32	---	---	0.040	---	---	1.04	---	4.8	---	158
8/25/2004	ARU	104	12.3	---	---	---	---	0.26	---	---	0.050	---	---	0.20	---	3.0	---	151
8/25/2004	ARU	100	8.7	---	---	---	---	0.15	---	---	0.030	---	---	0.56	---	3.6	---	127
8/25/2004	ARU	100	9.4	---	---	---	---	0.08	---	---	0.040	---	---	0.11	---	2.6	---	119
8/25/2004	ARU	130	19.4	---	---	---	---	0.09	---	---	0.050	---	---	0.09	---	2.7	---	99

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Appendix A3 Page 9 of 31.–Red Dog Mine, Aufeis Downstream (AD) and Aufeis North Fork (ANF) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/5/2002	AD	115	15.2	---	---	---	---	0.10	---	---	---	---	---	0.06	---	7.0	---	75
8/5/2002	AD	122	20.0	---	---	---	---	0.11	---	---	---	---	---	0.07	---	5.9	---	77
8/5/2002	AD	118	17.0	---	---	---	---	0.07	---	---	---	---	---	0.03	---	6.9	---	90
8/5/2002	AD	113	14.7	---	---	---	---	0.11	---	---	---	---	---	0.03	---	5.4	---	81
8/5/2002	AD	92	7.1	---	---	---	---	0.06	---	---	---	---	---	0.04	---	6.7	---	89
8/5/2002	AD	111	13.6	---	---	---	---	0.10	---	---	---	---	---	0.04	---	5.6	---	87
8/5/2002	AD	112	14.4	---	---	---	---	0.15	---	---	---	---	---	0.04	---	2.4	---	88
8/5/2002	AD	104	10.6	---	---	---	---	0.10	---	---	---	---	---	0.06	---	4.7	---	102
8/5/2002	AD	134	23.6	---	---	---	---	0.15	---	---	---	---	---	0.02	---	5.0	---	72
8/5/2002	AD	130	22.1	---	---	---	---	0.11	---	---	---	---	---	0.03	---	7.7	---	81
8/5/2002	AD	114	16.0	---	---	---	---	0.15	---	---	---	---	---	0.12	---	5.4	---	93
8/5/2002	AD	100	10.4	---	---	---	---	0.10	---	---	---	---	---	0.06	---	6.6	---	88
8/5/2002	AD	115	15.1	---	---	---	---	0.09	---	---	---	---	---	0.09	---	7.5	---	75
8/5/2002	AD	106	12.1	---	---	---	---	0.21	---	---	---	---	---	0.06	---	4.4	---	90
8/5/2002	AD	100	9.1	---	---	---	---	0.13	---	---	---	---	---	0.04	---	5.5	---	85
8/7/2001	ANF	140	22.8	---	---	---	---	0.11	---	---	---	---	---	0.17	---	3.5	---	106
8/7/2001	ANF	99	8.1	---	---	---	---	0.16	---	---	---	---	---	6.00	---	7.0	---	85
8/7/2001	ANF	92	7.2	---	---	---	---	0.12	---	---	---	---	---	1.55	---	2.6	---	85
8/7/2001	ANF	99	8.1	---	---	---	---	0.11	---	---	---	---	---	0.36	---	3.1	---	85
8/7/2001	ANF	84	4.7	---	---	---	---	0.17	---	---	---	---	---	0.13	---	5.0	---	121
8/5/2002	ANF	121	16.9	---	---	---	---	0.11	---	---	---	---	---	<0.02	---	1.9	---	75
8/5/2002	ANF	139	26.9	---	---	---	---	0.06	---	---	---	---	---	0.02	---	2.2	---	77
8/5/2002	ANF	103	10.8	---	---	---	---	0.11	---	---	---	---	---	<0.02	---	3.7	---	90
8/5/2002	ANF	118	15.3	---	---	---	---	0.08	---	---	---	---	---	<0.02	---	2.5	---	84
8/5/2002	ANF	118	16.0	---	---	---	---	0.06	---	---	---	---	---	0.02	---	4.0	---	104

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Appendix A3 Page 10 of 31.–Red Dog Mine, Aufeis North Fork (ANF) and Aufeis South Fork (ASF) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/5/2002	ANF	122	18.6	---	---	---	---	<0.05	---	---	---	---	---	<0.02	---	2.1	---	75
8/5/2002	ANF	128	19.4	---	---	---	---	0.06	---	---	---	---	---	<0.02	---	1.6	---	97
8/5/2002	ANF	128	21.3	---	---	---	---	0.06	---	---	---	---	---	<0.02	---	2.2	---	87
8/5/2002	ANF	95	8.8	---	---	---	---	0.05	---	---	---	---	---	<0.02	---	3.0	---	129
8/5/2002	ANF	110	12.7	---	---	---	---	0.07	---	---	---	---	---	<0.02	---	2.2	---	94
8/5/2002	ANF	129	20.3	---	---	---	---	<0.05	---	---	---	---	---	<0.02	---	1.5	---	82
8/5/2002	ANF	115	14.9	---	---	---	---	0.06	---	---	---	---	---	0.02	---	3.1	---	100
8/5/2002	ANF	112	13.0	---	---	---	---	<0.05	---	---	---	---	---	<0.02	---	2.9	---	85
8/5/2002	ANF	115	15.5	---	---	---	---	0.07	---	---	---	---	---	<0.02	---	3.0	---	97
8/5/2002	ANF	122	17.6	---	---	---	---	<0.05	---	---	---	---	---	<0.02	---	2.2	---	104
8/5/2002	ASF	116	16.2	---	---	---	---	<0.05	---	---	---	---	---	0.04	---	6.8	---	79
8/5/2002	ASF	118	16.2	---	---	---	---	<0.05	---	---	---	---	---	0.04	---	5.7	---	73
8/5/2002	ASF	118	18.4	---	---	---	---	0.05	---	---	---	---	---	0.04	---	4.1	---	86
8/5/2002	ASF	130	21.6	---	---	---	---	<0.05	---	---	---	---	---	0.05	---	3.7	---	84
8/5/2002	ASF	111	12.5	---	---	---	---	<0.05	---	---	---	---	---	0.04	---	3.6	---	108
8/5/2002	ASF	124	19.9	---	---	---	---	<0.05	---	---	---	---	---	0.04	---	4.7	---	80
8/5/2002	ASF	124	18.8	---	---	---	---	<0.05	---	---	---	---	---	0.26	---	6.8	---	78
8/5/2002	ASF	132	24.9	---	---	---	---	<0.05	---	---	---	---	---	<0.02	---	6.1	---	69
8/5/2002	ASF	125	19.7	---	---	---	---	0.05	---	---	---	---	---	0.03	---	5.9	---	77
8/5/2002	ASF	127	19.6	---	---	---	---	<0.05	---	---	---	---	---	0.02	---	6.6	---	69
8/5/2002	ASF	119	17.9	---	---	---	---	<0.05	---	---	---	---	---	<0.02	---	6.0	---	77
8/5/2002	ASF	118	17.2	---	---	---	---	<0.05	---	---	---	---	---	0.03	---	5.8	---	62
8/5/2002	ASF	120	18.3	---	---	---	---	<0.05	---	---	---	---	---	0.03	---	7.6	---	81
8/5/2002	ASF	105	10.7	---	---	---	---	<0.05	---	---	---	---	---	0.03	---	5.9	---	79
8/5/2002	ASF	113	15.3	---	---	---	---	0.05	---	---	---	---	---	0.12	---	4.5	---	88

-continued-

Appendix A3 Page 11 of 31.–Red Dog Mine, Buddy Downstream of Road (BD) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/29/2002	BD	108	13.4	---	---	---	---	0.50	---	---	---	---	---	0.38	---	7.8	---	110
7/29/2002	BD	100	9.9	---	---	---	---	0.56	---	---	---	---	---	0.41	---	7.9	---	122
7/29/2002	BD	99	9.6	---	---	---	---	0.70	---	---	---	---	---	0.19	---	5.9	---	152
7/29/2002	BD	100	10.1	---	---	---	---	0.60	---	---	---	---	---	0.19	---	7.5	---	127
7/29/2002	BD	104	12.8	---	---	---	---	0.95	---	---	---	---	---	0.71	---	8.4	---	150
7/29/2002	BD	102	11.6	---	---	---	---	0.74	---	---	---	---	---	0.55	---	6.3	---	121
7/29/2002	BD	117	15.1	---	---	---	---	0.39	---	---	---	---	---	0.37	---	5.9	---	141
7/29/2002	BD	106	10.8	---	---	---	---	0.43	---	---	---	---	---	0.25	---	7.0	---	128
7/29/2002	BD	110	13.3	---	---	---	---	0.93	---	---	---	---	---	0.23	---	7.1	---	132
7/29/2002	BD	110	13.8	---	---	---	---	0.28	---	---	---	---	---	0.16	---	7.1	---	117
7/29/2002	BD	112	14.5	---	---	---	---	0.31	---	---	---	---	---	0.65	---	8.8	---	120
7/29/2002	BD	136	23.9	---	---	---	---	0.24	---	---	---	---	---	0.35	---	6.8	---	125
7/29/2002	BD	112	13.8	---	---	---	---	0.44	---	---	---	---	---	0.23	---	7.8	---	103
7/29/2002	BD	144	28.3	---	---	---	---	0.39	---	---	---	---	---	0.39	---	6.6	---	123
7/29/2002	BD	144	28.6	---	---	---	---	0.29	---	---	---	---	---	0.35	---	8.1	---	117
8/9/2003	BD	108	12.3	---	---	---	---	0.72	---	---	---	---	---	1.18	---	8.4	---	160
8/9/2003	BD	118	15.4	---	---	---	---	0.50	---	---	---	---	---	1.44	---	6.0	---	130
8/9/2003	BD	122	18.5	---	---	---	---	0.54	---	---	---	---	---	0.49	---	6.1	---	125
8/9/2003	BD	106	11.8	---	---	---	---	0.77	---	---	---	---	---	0.44	---	6.8	---	138
8/9/2003	BD	134	20.7	---	---	---	---	0.57	---	---	---	---	---	0.52	---	7.6	---	125
8/9/2003	BD	118	14.0	---	---	---	---	0.39	---	---	---	---	---	1.37	---	7.0	---	130
8/9/2003	BD	120	15.1	---	---	---	---	0.77	---	---	---	---	---	0.60	---	7.1	---	138
8/9/2003	BD	102	8.8	---	---	---	---	1.75	---	---	---	---	---	0.58	---	6.7	---	165
8/9/2003	BD	102	8.8	---	---	---	---	0.35	---	---	---	---	---	0.18	---	8.5	---	122
8/9/2003	BD	109	11.2	---	---	---	---	0.42	---	---	---	---	---	0.41	---	6.9	---	118
8/9/2003	BD	104	9.9	---	---	---	---	0.62	---	---	---	---	---	0.46	---	6.9	---	143
8/9/2003	BD	115	15.0	---	---	---	---	0.43	---	---	---	---	---	0.17	---	7.1	---	130
8/9/2003	BD	90	5.4	---	---	---	---	0.48	---	---	---	---	---	0.53	---	5.0	---	180
8/9/2003	BD	110	11.0	---	---	---	---	1.12	---	---	---	---	---	0.59	---	6.6	---	154
8/9/2003	BD	102	9.7	---	---	---	---	0.94	---	---	---	---	---	0.46	---	5.5	---	167

-continued-

Appendix A3 Page 12 of 31.–Red Dog Mine, Buddy Downstream of Road (BD) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/24/2004	BD	130	18.7	---	---	---	---	0.47	---	---	0.030	---	---	0.34	---	5.7	---	120
8/24/2004	BD	118	13.9	---	---	---	---	0.60	---	---	0.040	---	---	0.31	---	6.3	---	129
8/24/2004	BD	107	10.1	---	---	---	---	0.22	---	---	0.040	---	---	0.29	---	4.9	---	116
8/24/2004	BD	103	8.9	---	---	---	---	0.26	---	---	0.040	---	---	0.19	---	3.9	---	172
8/24/2004	BD	124	16.1	---	---	---	---	0.24	---	---	0.030	---	---	0.11	---	5.9	---	163
8/24/2004	BD	96	6.7	---	---	---	---	0.35	---	---	0.040	---	---	0.17	---	3.7	---	111
8/24/2004	BD	116	14.7	---	---	---	---	0.14	---	---	0.030	---	---	0.18	---	4.8	---	93
8/24/2004	BD	96	7.2	---	---	---	---	0.10	---	---	0.050	---	---	0.06	---	2.6	---	93
8/24/2004	BD	101	10.1	---	---	---	---	0.26	---	---	0.040	---	---	4.52	---	4.2	---	122
8/24/2004	BD	116	14.7	---	---	---	---	0.17	---	---	0.020	---	---	0.12	---	5.8	---	110
8/24/2004	BD	100	9.3	---	---	---	---	0.22	---	---	0.040	---	---	0.11	---	4.5	---	116
8/24/2004	BD	120	15.5	---	---	---	---	0.24	---	---	0.030	---	---	0.14	---	6.3	---	129
8/24/2004	BD	108	11.7	---	---	---	---	0.28	---	---	0.030	---	---	0.10	---	5.2	---	204
8/24/2004	BD	140	25.4	---	---	---	---	0.36	---	---	0.030	---	---	0.11	---	5.8	---	128
8/24/2004	BD	135	21.1	---	---	---	---	0.47	---	---	0.020	---	---	0.10	---	7.2	---	123
7/29/2005	BD	104	10.9	---	---	---	---	1.53	---	---	0.030	---	---	0.18	---	8.0	---	149
7/29/2005	BD	106	12.0	---	---	---	---	0.50	---	---	0.020	---	---	0.10	---	6.9	---	134
7/29/2005	BD	115	14.2	---	---	---	---	1.37	---	---	0.030	---	---	0.16	---	6.8	---	132
7/29/2005	BD	102	9.9	---	---	---	---	0.60	---	---	0.030	---	---	0.10	---	7.4	---	141
7/29/2005	BD	110	11.9	---	---	---	---	0.41	---	---	0.020	---	---	0.15	---	5.6	---	114
7/29/2005	BD	134	18.6	---	---	---	---	0.20	---	---	0.030	---	---	0.10	---	7.0	---	131
7/29/2005	BD	105	10.6	---	---	---	---	0.58	---	---	0.020	---	---	0.09	---	6.4	---	145
7/29/2005	BD	120	16.0	---	---	---	---	0.26	---	---	0.020	---	---	0.10	---	5.7	---	110
7/29/2005	BD	102	10.1	---	---	---	---	0.87	---	---	0.030	---	---	0.17	---	7.1	---	137
7/29/2005	BD	101	9.7	---	---	---	---	1.23	---	---	0.040	---	---	0.13	---	5.9	---	159
7/29/2005	BD	125	17.4	---	---	---	---	0.58	---	---	0.040	---	---	0.28	---	5.9	---	106
7/29/2005	BD	114	12.1	---	---	---	---	0.61	---	---	0.030	---	---	0.14	---	7.4	---	144
7/29/2005	BD	105	9.4	---	---	---	---	0.77	---	---	<0.020	---	---	0.19	---	5.8	---	135
7/29/2005	BD	103	9.0	---	---	---	---	0.45	---	---	0.020	---	---	0.14	---	5.6	---	131
7/29/2005	BD	105	11.2	---	---	---	---	0.62	---	---	0.030	---	---	0.13	---	7.2	---	123

-continued-

Appendix A3 Page 13 of 31.–Red Dog Mine, Buddy Downstream of Road (BD) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/15/2006	BD	93	7.3	---	---	---	---	1.69	---	---	0.080	---	---	0.38	---	5.2	---	227
8/15/2006	BD	98	9.7	---	---	---	---	1.64	---	---	0.040	---	---	0.47	---	6.3	---	215
8/15/2006	BD	82	5.8	---	---	---	---	2.18	---	---	0.050	---	---	1.36	---	5.2	---	230
8/15/2006	BD	95	8.8	---	---	---	---	0.81	---	---	0.040	---	---	0.38	---	5.4	---	236
8/15/2006	BD	92	8.5	---	---	---	---	1.07	---	---	0.030	---	---	2.27	---	6.2	---	205
8/11/2007	BD	114	12.9	---	---	---	---	0.77	---	---	0.040	---	---	0.66	---	4.8	---	142
8/11/2007	BD	118	14.0	---	---	---	---	0.27	---	---	0.040	---	---	0.11	---	4.8	---	113
8/11/2007	BD	121	15.9	---	---	---	---	0.44	---	---	0.040	---	---	0.21	---	4.7	---	129
8/11/2007	BD	104	9.9	---	---	---	---	0.69	---	---	0.050	---	---	0.14	---	4.1	---	125
8/11/2007	BD	103	10.2	---	---	---	---	0.80	---	---	0.040	---	---	0.12	---	4.0	---	154
8/11/2007	BD	131	18.9	---	---	---	---	0.74	---	---	0.020	---	---	2.19	---	3.6	---	181
8/11/2007	BD	112	13.1	---	---	---	---	0.57	---	---	0.040	---	---	0.66	---	4.7	---	137
8/11/2007	BD	115	12.7	---	---	---	---	0.80	---	---	0.040	---	---	0.11	---	4.9	---	146
8/11/2007	BD	112	12.4	---	---	---	---	0.76	---	---	0.050	---	---	0.42	---	5.7	---	130
8/11/2007	BD	135	20.4	---	---	---	---	0.43	---	---	0.060	---	---	0.19	---	3.7	---	116
8/11/2007	BD	111	11.4	---	---	---	---	0.94	---	---	0.030	---	---	0.10	---	4.7	---	132
8/11/2007	BD	131	18.8	---	---	---	---	0.28	---	---	0.060	---	---	0.23	---	5.6	---	129
8/11/2007	BD	105	10.3	---	---	---	---	0.35	---	---	0.100	---	---	1.02	---	4.5	---	133
8/11/2007	BD	109	11.2	---	---	---	---	0.47	---	---	0.030	---	---	2.23	---	4.0	---	134
8/11/2007	BD	93	7.4	---	---	---	---	0.67	---	---	0.040	---	---	0.26	---	3.7	---	126
8/5/2008	BD	103	9.7	---	---	---	---	2.15	---	---	0.040	---	---	0.21	---	6.2	---	180
8/5/2008	BD	97	7.5	---	---	---	---	1.72	---	---	0.050	---	---	1.15	---	5.3	---	219
8/5/2008	BD	97	7.2	---	---	---	---	1.68	---	---	0.050	---	---	0.51	---	5.4	---	200
8/5/2008	BD	102	9.0	---	---	---	---	0.83	---	---	0.040	---	---	0.50	---	4.4	---	165
8/5/2008	BD	98	7.3	---	---	---	---	0.59	---	---	0.040	---	---	0.35	---	4.8	---	195
8/5/2008	BD	111	11.7	---	---	---	---	0.78	---	---	0.050	---	---	0.68	---	4.8	---	144
8/5/2008	BD	93	6.1	---	---	---	---	1.25	---	---	0.050	---	---	0.27	---	7.7	---	197
8/5/2008	BD	104	9.2	---	---	---	---	0.67	---	---	0.040	---	---	0.28	---	5.5	---	208

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Appendix A3 Page 14 of 31.–Red Dog Mine, Buddy Downstream of Road (BD) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/5/2008	BD	94	8.0	---	---	---	---	0.59	---	---	0.050	---	---	0.27	---	5.4	---	182
8/5/2008	BD	103	9.7	---	---	---	---	0.94	---	---	0.040	---	---	1.27	---	5.9	---	169
8/5/2008	BD	114	11.6	---	---	---	---	0.68	---	---	0.040	---	---	0.31	---	4.9	---	166
8/5/2008	BD	95	7.8	---	---	---	---	0.34	---	---	0.050	---	---	0.30	---	5.8	---	220
8/5/2008	BD	103	9.6	---	---	---	---	0.41	---	---	0.040	---	---	0.15	---	5.7	---	162
8/5/2008	BD	98	7.1	---	---	---	---	1.13	---	---	0.060	---	---	0.25	---	4.5	---	251
8/5/2008	BD	96	7.9	---	---	---	---	0.49	---	---	0.050	---	---	0.09	---	4.4	---	170
7/31/2009	BD	103	9.7	---	---	---	---	0.19	---	---	0.060	---	---	0.38	---	8.4	---	132
7/31/2009	BD	97	7.5	---	---	---	---	1.21	---	---	0.040	---	---	0.52	---	10.7	---	143
7/31/2009	BD	97	7.2	---	---	---	---	0.80	---	---	0.090	---	---	0.89	---	11.3	---	134
7/31/2009	BD	102	9.0	---	---	---	---	1.77	---	---	0.040	---	---	0.34	---	8.4	---	141
7/31/2009	BD	98	7.3	---	---	---	---	0.75	---	---	0.050	---	---	0.50	---	9.3	---	113
7/31/2009	BD	111	11.7	---	---	---	---	0.97	---	---	0.040	---	---	0.35	---	8.7	---	136
7/31/2009	BD	93	6.1	---	---	---	---	0.98	---	---	0.060	---	---	0.48	---	8.5	---	155
7/31/2009	BD	104	9.2	---	---	---	---	0.85	---	---	0.050	---	---	0.34	---	6.2	---	220
7/31/2009	BD	94	8.0	---	---	---	---	0.38	---	---	0.050	---	---	0.41	---	6.7	---	129
7/31/2009	BD	103	9.7	---	---	---	---	0.38	---	---	0.040	---	---	0.51	---	9.1	---	127
7/31/2009	BD	114	11.6	---	---	---	---	0.78	---	---	0.040	---	---	0.96	---	10.3	---	163
7/31/2009	BD	95	7.8	---	---	---	---	0.66	---	---	0.060	---	---	0.20	---	7.2	---	124
7/31/2009	BD	103	9.6	---	---	---	---	0.40	---	---	0.060	---	---	0.78	---	7.8	---	141
7/31/2009	BD	98	7.1	---	---	---	---	1.26	---	---	0.040	---	---	0.48	---	9.0	---	177
7/31/2009	BD	96	7.9	---	---	---	---	0.87	---	---	0.050	---	---	0.34	---	9.1	---	143

-continued-

Appendix A3 Page 15 of 31.–Red Dog Mine, Buddy Downstream of Road (BD) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/16/2010	BD	105	10.3	---	---	---	---	0.83	---	---	0.020	---	---	0.56	---	5.3	---	119
8/16/2010	BD	115	14.5	---	---	---	---	0.38	---	---	<0.020	---	---	0.13	---	4.5	---	116
8/16/2010	BD	116	14.3	---	---	---	---	0.39	---	---	0.030	---	---	0.25	---	5.7	---	130
8/16/2010	BD	128	20.3	---	---	---	---	0.54	---	---	<0.020	---	---	0.10	---	3.9	---	97
8/16/2010	BD	125	19.8	---	---	---	---	0.48	---	---	<0.020	---	---	0.17	---	5.0	---	108
8/16/2010	BD	128	19.0	---	---	---	---	0.35	---	---	0.020	---	---	0.41	---	5.2	---	120
8/16/2010	BD	121	16.5	---	---	---	---	0.60	---	---	<0.020	---	---	0.60	---	3.7	---	141
8/16/2010	BD	125	18.3	---	---	---	---	0.27	---	---	<0.020	---	---	0.44	---	4.3	---	107
8/16/2010	BD	133	21.3	---	---	---	---	1.02	---	---	0.030	---	---	0.33	---	6.3	---	131
8/16/2010	BD	127	15.3	---	---	---	---	0.49	---	---	0.040	---	---	0.20	---	4.1	---	107
8/16/2010	BD	128	19.5	---	---	---	---	0.18	---	---	<0.020	---	---	0.09	---	6.6	---	113
8/16/2010	BD	113	13.3	---	---	---	---	0.66	---	---	<0.020	---	---	0.13	---	5.2	---	124
8/16/2010	BD	122	17.3	---	---	---	---	0.22	---	---	0.040	---	---	0.57	---	5.2	---	113
8/16/2010	BD	130	22.0	---	---	---	---	0.95	---	---	0.020	---	---	0.21	---	3.7	---	114
8/16/2010	BD	117	15.8	---	---	---	---	1.14	---	---	0.020	---	---	0.29	---	4.7	---	133
8/27/2011	BD	128	21.0	---	---	---	---	0.37	---	---	0.020	---	---	0.25	---	3.8	---	118
8/27/2011	BD	124	18.0	---	---	---	---	0.52	---	---	0.020	---	---	0.25	---	4.1	---	126
8/27/2011	BD	137	23.0	---	---	---	---	0.30	---	---	0.020	---	---	0.30	---	4.6	---	122
8/27/2011	BD	129	21.5	---	---	---	---	0.44	---	---	0.020	---	---	0.39	---	3.3	---	113
8/27/2011	BD	122	18.5	---	---	---	---	0.24	---	---	0.020	---	---	0.14	---	3.5	---	93
8/27/2011	BD	106	15.0	---	---	---	---	0.35	---	---	0.020	---	---	0.43	---	3.0	---	113
8/27/2011	BD	140	25.5	---	---	---	---	0.30	---	---	0.020	---	---	0.22	---	3.9	---	101
8/27/2011	BD	124	19.5	---	---	---	---	0.41	---	---	0.030	---	---	0.16	---	3.4	---	94
8/27/2011	BD	127	20.0	---	---	---	---	1.27	---	---	0.030	---	---	0.94	---	4.6	---	154
8/27/2011	BD	100	10.5	---	---	---	---	0.75	---	---	<0.030	---	---	0.23	---	4.4	---	147
8/27/2011	BD	128	19.5	---	---	---	---	0.21	---	---	0.020	---	---	0.55	---	3.4	---	103
8/27/2011	BD	128	19.5	---	---	---	---	0.48	---	---	0.020	---	---	0.21	---	4.2	---	133
8/27/2011	BD	109	12.0	---	---	---	---	0.75	---	---	0.030	---	---	0.26	---	3.8	---	143
8/27/2011	BD	126	18.5	---	---	---	---	0.27	---	---	0.030	---	---	1.06	---	3.2	---	122
8/27/2011	BD	105	11.5	---	---	---	---	0.61	---	---	0.020	---	---	0.12	---	3.6	---	130

-continued-

Appendix A3 Page 16 of 31.–Red Dog Mine, Buddy Downstream of Road (BD) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/29/2014	BD	126	20.5	---	---	---	---	1.28	---	2.8	0.020	---	---	0.90	---	8.3	---	128
7/29/2014	BD	107	12.0	---	---	---	---	0.81	---	2.8	0.030	---	---	0.83	---	7.4	---	142
7/29/2014	BD	120	16.5	---	---	---	---	0.63	---	2.8	0.020	---	---	0.73	---	6.7	---	132
7/29/2014	BD	136	23.0	---	---	---	---	1.12	---	3.3	0.030	---	---	0.74	---	8.2	---	142
7/29/2014	BD	126	18.0	---	---	---	---	0.79	---	2.8	0.020	---	---	1.50	---	8.1	---	175
7/29/2014	BD	135	22.0	---	---	---	---	0.49	---	3.6	0.030	---	---	0.85	---	6.9	---	147
7/29/2014	BD	123	17.5	---	---	---	---	0.54	---	3.3	0.060	---	---	0.49	---	6.7	---	138
7/29/2014	BD	126	18.5	---	---	---	---	1.39	---	4.1	0.040	---	---	2.06	---	6.8	---	214
7/29/2014	BD	122	15.5	---	---	---	---	1.47	---	3.2	0.030	---	---	1.42	---	8.3	---	195
7/29/2014	BD	127	17.0	---	---	---	---	0.49	---	3.1	0.030	---	---	0.40	---	7.1	---	165
7/29/2014	BD	144	25.0	---	---	---	---	0.35	---	2.9	0.030	---	---	0.55	---	7.9	---	136
7/29/2014	BD	106	10.0	---	---	---	---	0.57	---	3.2	0.030	---	---	0.64	---	8.8	---	236
7/29/2014	BD	105	10.0	---	---	---	---	1.32	---	3.6	<0.020	---	---	1.00	---	8.7	---	173
7/29/2014	BD	103	10.5	---	---	---	---	1.65	---	4.4	0.020	---	---	2.74	---	7.2	---	175
7/29/2014	BD	100	8.5	---	---	---	---	1.03	---	2.7	0.030	---	---	9.45	---	5.6	---	131
7/31/2015	BD	97	10.0	---	---	---	---	1.22	---	3.5	0.020	---	---	0.27	---	8.8	---	184
7/31/2015	BD	110	13.5	---	---	---	---	0.83	---	3.7	0.030	---	---	0.16	---	9.4	---	174
7/31/2015	BD	106	12.5	---	---	---	---	2.96	---	4.0	0.030	---	---	0.34	---	9.7	---	233
7/31/2015	BD	102	10.5	---	---	---	---	1.34	---	4.8	0.030	---	---	0.44	---	10.2	---	187
7/31/2015	BD	104	10.5	---	---	---	---	0.86	---	3.3	<0.020	---	---	0.16	---	9.5	---	196
7/31/2015	BD	95	8.5	---	---	---	---	1.23	---	4.0	0.030	---	---	0.32	---	8.8	---	217
7/31/2015	BD	99	10.0	---	---	---	---	0.94	---	4.1	<0.020	---	---	0.21	---	9.1	---	197
7/31/2015	BD	126	18.5	---	---	---	---	0.85	---	4.2	0.040	---	---	0.23	---	9.0	---	203
7/31/2015	BD	121	18.0	---	---	---	---	0.61	---	4.1	0.030	---	---	0.30	---	11.4	---	194
7/31/2015	BD	115	14.0	---	---	---	---	0.79	---	4.2	0.020	---	---	0.18	---	10.0	---	185
7/31/2015	BD	115	15.0	---	---	---	---	0.56	---	3.6	0.020	---	---	0.18	---	8.3	---	198
7/31/2015	BD	103	10.5	---	---	---	---	0.25	---	3.8	0.020	---	---	0.23	---	7.1	---	131
7/31/2015	BD	104	11.5	---	---	---	---	0.83	---	3.4	<0.020	---	---	0.18	---	8.4	---	171
7/31/2015	BD	100	10.5	---	---	---	---	1.16	---	3.9	0.020	---	---	0.27	---	8.2	---	201
7/31/2015	BD	103	11.0	---	---	---	---	0.87	---	3.8	0.020	---	---	0.22	---	11.1	---	201

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Appendix A3 Page 17 of 31.–Red Dog Mine, Competition Lower 202 (COM) and Evaingiknuk (EVA) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/31/2014	COM	134	19.0	---	---	---	---	0.61	---	---	0.030	---	---	0.49	---	6.1	---	135
7/31/2014	COM	140	23.5	---	---	---	---	0.19	---	---	0.020	---	---	0.08	---	4.3	---	132
7/31/2014	COM	138	23.0	---	---	---	---	0.38	---	---	<0.020	---	---	0.25	---	4.0	---	139
7/31/2014	COM	148	25.5	---	---	---	---	0.36	---	---	<0.020	---	---	0.55	---	4.9	---	111
7/31/2014	COM	122	16.0	---	---	---	---	0.45	---	---	<0.020	---	---	0.67	---	4.6	---	170
7/31/2014	COM	100	9.0	---	---	---	---	0.86	---	---	0.030	---	---	1.04	---	4.6	---	175
7/31/2014	COM	94	7.0	---	---	---	---	0.62	---	---	0.030	---	---	0.23	---	6.5	---	126
7/30/2001	EVA	89	5.1	---	---	---	---	0.29	---	---	---	---	---	0.82	---	2.1	---	160
7/30/2001	EVA	78	3.1	---	---	---	---	0.17	---	---	---	---	---	0.36	---	3.4	---	137
7/30/2001	EVA	130	17.2	---	---	---	---	0.16	---	---	---	---	---	0.23	---	2.0	---	124
7/30/2001	EVA	81	4.1	---	---	---	---	0.19	---	---	---	---	---	0.31	---	2.8	---	111
7/30/2001	EVA	90	5.1	---	---	---	---	0.16	---	---	---	---	---	0.31	---	4.4	---	138
7/30/2001	EVA	100	7.7	---	---	---	---	0.22	---	---	---	---	---	0.55	---	2.7	---	129
7/30/2001	EVA	126	17.6	---	---	---	---	0.14	---	---	---	---	---	0.17	---	5.7	---	119
7/30/2001	EVA	117	14.4	---	---	---	---	0.30	---	---	---	---	---	0.13	---	2.2	---	130
7/30/2001	EVA	87	4.3	---	---	---	---	0.13	---	---	---	---	---	0.15	---	2.6	---	120
8/8/2003	EVA	99	11.4	---	---	---	---	0.35	---	---	---	---	---	0.31	---	1.3	---	170
8/8/2003	EVA	104	10.0	---	---	---	---	0.27	---	---	---	---	---	0.08	---	1.2	---	125
8/8/2003	EVA	100	10.8	---	---	---	---	0.31	---	---	---	---	---	0.15	---	1.3	---	156
8/8/2003	EVA	96	8.1	---	---	---	---	0.37	---	---	---	---	---	0.08	---	1.9	---	164
8/8/2003	EVA	106	10.8	---	---	---	---	0.31	---	---	---	---	---	0.09	---	1.7	---	151
8/8/2003	EVA	94	9.2	---	---	---	---	0.34	---	---	---	---	---	0.10	---	1.3	---	161
8/8/2003	EVA	109	12.2	---	---	---	---	0.30	---	---	---	---	---	0.12	---	<1	---	139
8/8/2003	EVA	117	11.9	---	---	---	---	0.66	---	---	---	---	---	0.07	---	1.8	---	139
8/8/2003	EVA	100	10.1	---	---	---	---	0.64	---	---	---	---	---	0.12	---	1.4	---	153
8/8/2003	EVA	99	10.0	---	---	---	---	0.36	---	---	---	---	---	0.18	---	1.3	---	154
8/8/2003	EVA	95	7.8	---	---	---	---	0.34	---	---	---	---	---	0.16	---	1.4	---	139
8/8/2003	EVA	100	9.1	---	---	---	---	0.28	---	---	---	---	---	0.06	---	1.6	---	151
8/8/2003	EVA	100	8.7	---	---	---	---	0.33	---	---	---	---	---	0.11	---	2.6	---	141
8/8/2003	EVA	103	9.2	---	---	---	---	0.33	---	---	---	---	---	0.09	---	1.6	---	167
8/8/2003	EVA	96	8.3	---	---	---	---	0.20	---	---	---	---	---	0.09	---	4.1	---	150

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Appendix A3 Page 18 of 31.–Red Dog Mine, Evaingiknuk (EVA) and Ferric (FER) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/19/2004	EVA	140	24.6	---	---	---	---	0.30	---	---	0.100	---	---	0.12	---	1.7	---	173
8/19/2004	EVA	128	17.9	---	---	---	---	0.10	---	---	0.120	---	---	0.11	---	1.3	---	113
8/19/2004	EVA	135	21.5	---	---	---	---	0.35	---	---	0.150	---	---	0.36	---	1.9	---	203
8/19/2004	EVA	139	22.1	---	---	---	---	0.34	---	---	0.140	---	---	0.12	---	1.8	---	178
8/19/2004	EVA	94	6.5	---	---	---	---	0.24	---	---	0.120	---	---	0.23	---	2.5	---	179
8/19/2004	EVA	100	8.8	---	---	---	---	0.27	---	---	0.120	---	---	0.24	---	1.6	---	169
8/19/2004	EVA	127	18.3	---	---	---	---	0.42	---	---	0.130	---	---	0.13	---	1.8	---	186
8/19/2004	EVA	109	10.1	---	---	---	---	0.11	---	---	0.150	---	---	0.19	---	1.3	---	141
8/19/2004	EVA	140	24.0	---	---	---	---	0.21	---	---	0.150	---	---	0.06	---	1.4	---	114
8/19/2004	EVA	121	14.7	---	---	---	---	0.23	---	---	1.160	---	---	0.23	---	1.4	---	180
8/19/2004	EVA	138	23.7	---	---	---	---	0.19	---	---	0.110	---	---	0.12	---	1.4	---	143
8/19/2004	EVA	138	22.5	---	---	---	---	0.11	---	---	0.090	---	---	0.04	---	1.2	---	111
8/19/2004	EVA	97	7.2	---	---	---	---	0.23	---	---	0.130	---	---	0.08	---	1.4	---	165
8/19/2004	EVA	92	6.1	---	---	---	---	0.08	---	---	0.060	---	---	0.12	---	2.2	---	160
8/19/2004	EVA	102	8.4	---	---	---	---	0.06	---	---	0.040	---	---	0.13	---	2.3	---	122
8/12/1999	FER	123	---	---	---	---	---	0.09	---	---	---	---	---	0.36	---	5.3	---	---
8/12/1999	FER	125	---	---	---	---	---	0.21	---	---	---	---	---	0.37	---	5.2	---	---
8/12/1999	FER	149	---	---	---	---	---	0.06	---	---	---	---	---	0.22	---	6.3	---	---
8/12/1999	FER	141	---	---	---	---	---	0.06	---	---	---	---	---	0.33	---	5.6	---	---
8/12/1999	FER	123	---	---	---	---	---	0.26	---	---	---	---	---	0.42	---	6.2	---	---
8/12/1999	FER	141	---	---	---	---	---	0.11	---	---	---	---	---	0.18	---	6.5	---	---
8/12/1999	FER	115	---	---	---	---	---	0.27	---	---	---	---	---	0.30	---	6.6	---	---
8/12/1999	FER	116	---	---	---	---	---	0.16	---	---	---	---	---	0.22	---	5.7	---	---
8/12/1999	FER	107	---	---	---	---	---	0.07	---	---	---	---	---	0.21	---	4.7	---	---

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Appendix A3 Page 19 of 31.–Red Dog Mine, Grayling Junior (GJR) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/1/2001	GJR	137	21.0	---	---	---	---	0.69	---	---	---	---	---	0.16	---	7.4	---	171
8/1/2001	GJR	109	11.3	---	---	---	---	3.78	---	---	---	---	---	1.44	---	7.2	---	573
8/1/2001	GJR	85	5.2	---	---	---	---	1.64	---	---	---	---	---	0.48	---	6.4	---	235
8/1/2001	GJR	108	9.9	---	---	---	---	2.30	---	---	---	---	---	0.89	---	6.6	---	344
8/1/2001	GJR	90	6.1	---	---	---	---	0.71	---	---	---	---	---	0.28	---	5.9	---	202
8/1/2001	GJR	90	5.8	---	---	---	---	1.27	---	---	---	---	---	0.55	---	7.5	---	250
8/1/2001	GJR	87	5.1	---	---	---	---	1.66	---	---	---	---	---	0.45	---	7.4	---	273
8/1/2001	GJR	87	4.6	---	---	---	---	1.48	---	---	---	---	---	0.59	---	6.0	---	299
8/1/2001	GJR	94	6.1	---	---	---	---	1.60	---	---	---	---	---	0.57	---	7.2	---	328
8/1/2001	GJR	81	3.9	---	---	---	---	1.96	---	---	---	---	---	0.93	---	7.5	---	499
8/27/2004	GJR	131	20.4	---	---	---	---	0.30	---	---	0.030	---	---	0.09	---	6.0	---	95
8/27/2004	GJR	91	6.1	---	---	---	---	0.73	---	---	0.020	---	---	0.22	---	6.7	---	173
8/27/2004	GJR	84	4.7	---	---	---	---	0.46	---	---	<0.020	---	---	0.10	---	6.0	---	133
8/27/2004	GJR	129	20.0	---	---	---	---	0.66	---	---	0.020	---	---	0.14	---	5.8	---	176
8/27/2004	GJR	91	7.7	---	---	---	---	0.21	---	---	<0.020	---	---	0.15	---	4.4	---	109
8/27/2004	GJR	117	15.4	---	---	---	---	0.37	---	---	<0.020	---	---	0.14	---	2.0	---	153
8/27/2004	GJR	80	4.2	---	---	---	---	0.54	---	---	<0.020	---	---	0.38	---	2.9	---	189
8/27/2004	GJR	84	5.6	---	---	---	---	0.28	---	---	0.020	---	---	0.19	---	2.6	---	101
8/27/2004	GJR	83	4.9	---	---	---	---	0.29	---	---	<0.020	---	---	0.27	---	3.4	---	114
8/27/2004	GJR	84	5.1	---	---	---	---	0.62	---	---	<0.020	---	---	0.29	---	2.8	---	156
8/27/2004	GJR	81	5.0	---	---	---	---	0.24	---	---	<0.020	---	---	0.17	---	2.7	---	120
8/27/2004	GJR	82	4.9	---	---	---	---	0.21	---	---	0.020	---	---	0.32	---	2.6	---	116
8/27/2004	GJR	87	6.0	---	---	---	---	0.17	---	---	<0.020	---	---	0.15	---	2.5	---	153
8/27/2004	GJR	84	5.1	---	---	---	---	0.20	---	---	<0.020	---	---	0.19	---	3.7	---	119
8/27/2004	GJR	83	4.9	---	---	---	---	0.61	---	---	<0.020	---	---	0.12	---	2.3	---	163

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Appendix A3 Page 20 of 31.–Red Dog Mine, Ikalukrok (IKA) and Omikviorok Downstream (OD) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/5/2001	IKA	122	15.6	---	---	---	---	1.81	---	---	---	---	---	1.75	---	5.1	---	333
8/5/2001	IKA	77	3.5	---	---	---	---	1.47	---	---	---	---	---	1.83	---	4.2	---	242
8/5/2001	IKA	99	7.4	---	---	---	---	0.48	---	---	---	---	---	0.80	---	4.6	---	146
8/5/2001	IKA	93	4.8	---	---	---	---	0.77	---	---	---	---	---	1.82	---	5.0	---	170
8/5/2001	IKA	96	6.5	---	---	---	---	1.03	---	---	---	---	---	0.35	---	4.8	---	159
8/5/2001	IKA	91	5.5	---	---	---	---	1.06	---	---	---	---	---	0.67	---	5.2	---	217
8/6/2001	OD	138	21.0	---	---	---	---	0.10	---	---	---	---	---	0.21	---	3.1	---	118
8/6/2001	OD	139	20.4	---	---	---	---	0.08	---	---	---	---	---	0.09	---	2.6	---	111
8/6/2001	OD	104	8.4	---	---	---	---	0.05	---	---	---	---	---	0.13	---	3.4	---	99
8/6/2001	OD	87	4.6	---	---	---	---	0.09	---	---	---	---	---	0.41	---	2.7	---	131
8/6/2001	OD	87	5.2	---	---	---	---	0.07	---	---	---	---	---	0.08	---	2.6	---	98
8/6/2001	OD	91	5.2	---	---	---	---	0.07	---	---	---	---	---	0.51	---	2.9	---	121
8/6/2001	OD	133	22.8	---	---	---	---	0.10	---	---	---	---	---	1.05	---	2.8	---	100
8/6/2001	OD	134	20.3	---	---	---	---	0.06	---	---	---	---	---	0.22	---	3.3	---	116
8/6/2001	OD	100	8.0	---	---	---	---	0.06	---	---	---	---	---	0.27	---	3.4	---	106
8/6/2001	OD	98	7.2	---	---	---	---	0.05	---	---	---	---	---	0.21	---	2.1	---	107
8/4/2002	OD	128	19.7	---	---	---	---	0.06	---	---	---	---	---	0.17	---	3.0	---	114
8/4/2002	OD	124	18.8	---	---	---	---	<0.05	---	---	---	---	---	<0.02	---	4.7	---	105
8/4/2002	OD	103	10.1	---	---	---	---	0.09	---	---	---	---	---	0.02	---	4.0	---	113
8/4/2002	OD	119	17.2	---	---	---	---	<0.05	---	---	---	---	---	0.02	---	2.3	---	134
8/4/2002	OD	99	8.9	---	---	---	---	<0.05	---	---	---	---	---	<0.02	---	2.9	---	109
8/4/2002	OD	110	11.7	---	---	---	---	<0.05	---	---	---	---	---	0.04	---	3.3	---	114
8/4/2002	OD	98	9.2	---	---	---	---	0.20	---	---	---	---	---	<0.02	---	4.1	---	120
8/4/2002	OD	114	16.2	---	---	---	---	0.14	---	---	---	---	---	0.14	---	3.1	---	91
8/4/2002	OD	93	8.3	---	---	---	---	0.14	---	---	---	---	---	0.03	---	4.8	---	128

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Appendix A3 Page 21 of 31.–Red Dog Mine, Omikviorok Downstream (OD) and Omikviorok North Fork (ONF) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/4/2002	OD	142	24.7	---	---	---	---	<0.05	---	---	---	---	---	0.03	---	2.3	---	112
8/4/2002	OD	107	12.1	---	---	---	---	0.07	---	---	---	---	---	0.02	---	1.8	---	106
8/4/2002	OD	105	11.7	---	---	---	---	0.09	---	---	---	---	---	0.04	---	4.3	---	133
8/4/2002	OD	102	10.4	---	---	---	---	0.07	---	---	---	---	---	0.05	---	2.8	---	108
8/4/2002	OD	112	13.8	---	---	---	---	0.09	---	---	---	---	---	<0.02	---	3.3	---	83
8/4/2002	OD	135	20.6	---	---	---	---	0.08	---	---	---	---	---	0.03	---	3.2	---	147
8/6/2001	ONF	123	13.5	---	---	---	---	0.09	---	---	---	---	---	3.03	---	3.1	---	107
8/6/2001	ONF	83	4.2	---	---	---	---	0.11	---	---	---	---	---	0.34	---	3.1	---	120
8/6/2001	ONF	131	18.7	---	---	---	---	0.12	---	---	---	---	---	0.17	---	3.2	---	94
8/6/2001	ONF	132	18.2	---	---	---	---	0.08	---	---	---	---	---	0.19	---	2.6	---	106
8/6/2001	ONF	134	19.7	---	---	---	---	0.08	---	---	---	---	---	0.06	---	2.5	---	105
8/6/2001	ONF	133	18.7	---	---	---	---	0.14	---	---	---	---	---	0.07	---	2.7	---	85
8/6/2001	ONF	95	6.8	---	---	---	---	0.04	---	---	---	---	---	0.04	---	2.1	---	92
8/6/2001	ONF	87	4.7	---	---	---	---	0.09	---	---	---	---	---	0.06	---	2.6	---	72
8/6/2001	ONF	111	10.7	---	---	---	---	0.08	---	---	---	---	---	0.11	---	2.1	---	155
8/6/2001	ONF	105	9.1	---	---	---	---	0.10	---	---	---	---	---	0.08	---	2.8	---	144
8/4/2002	ONF	122	15.8	---	---	---	---	0.08	---	---	---	---	---	0.21	---	5.4	---	110
8/4/2002	ONF	130	17.8	---	---	---	---	0.09	---	---	---	---	---	0.06	---	4.5	---	102
8/4/2002	ONF	138	21.5	---	---	---	---	0.10	---	---	---	---	---	0.07	---	6.9	---	98
8/4/2002	ONF	119	11.8	---	---	---	---	0.09	---	---	---	---	---	0.26	---	4.4	---	159
8/4/2002	ONF	105	9.3	---	---	---	---	0.09	---	---	---	---	---	0.06	---	4.0	---	92
8/4/2002	ONF	124	15.2	---	---	---	---	0.11	---	---	---	---	---	0.05	---	3.1	---	127
8/4/2002	ONF	120	13.6	---	---	---	---	0.15	---	---	---	---	---	0.10	---	3.5	---	128

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Appendix A3 Page 22 of 31.–Red Dog Mine, Omikviorok North Fork (ONF) and Omikviorok South Fork (OSF) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/4/2002	ONF	95	6.4	---	---	---	---	0.09	---	---	---	---	---	0.06	---	3.8	---	142
8/5/2002	ONF	124	15.7	---	---	---	---	0.08	---	---	---	---	---	0.07	---	0.3	---	107
8/5/2002	ONF	112	10.8	---	---	---	---	0.06	---	---	---	---	---	0.17	---	3.1	---	111
8/5/2002	ONF	119	14.0	---	---	---	---	<0.05	---	---	---	---	---	0.03	---	4.7	---	129
8/5/2002	ONF	123	16.1	---	---	---	---	0.08	---	---	---	---	---	0.13	---	3.4	---	95
8/5/2002	ONF	116	12.2	---	---	---	---	0.09	---	---	---	---	---	0.07	---	3.8	---	125
8/5/2002	ONF	121	13.8	---	---	---	---	0.06	---	---	---	---	---	<0.02	---	3.6	---	117
8/5/2002	ONF	102	9.8	---	---	---	---	0.14	---	---	---	---	---	0.12	---	3.8	---	107
8/4/2002	OSF	95	6.8	---	---	---	---	0.05	---	---	---	---	---	0.06	---	5.1	---	112
8/4/2002	OSF	129	18.0	---	---	---	---	<0.05	---	---	---	---	---	0.04	---	3.2	---	84
8/4/2002	OSF	135	20.8	---	---	---	---	<0.05	---	---	---	---	---	0.13	---	3.0	---	94
8/4/2002	OSF	142	23.7	---	---	---	---	0.06	---	---	---	---	---	0.06	---	2.8	---	131
8/4/2002	OSF	106	12.1	---	---	---	---	0.06	---	---	---	---	---	0.05	---	2.8	---	105
8/4/2002	OSF	129	17.9	---	---	---	---	<0.05	---	---	---	---	---	0.05	---	2.9	---	143
8/4/2002	OSF	114	14.1	---	---	---	---	0.06	---	---	---	---	---	0.13	---	2.7	---	116
8/4/2002	OSF	97	8.2	---	---	---	---	0.06	---	---	---	---	---	0.03	---	5.2	---	122
8/4/2002	OSF	110	12.0	---	---	---	---	0.06	---	---	---	---	---	0.05	---	3.4	---	120
8/4/2002	OSF	128	17.6	---	---	---	---	<0.05	---	---	---	---	---	0.05	---	3.3	---	104
8/4/2002	OSF	110	11.0	---	---	---	---	<0.05	---	---	---	---	---	0.07	---	2.3	---	115
8/4/2002	OSF	110	10.7	---	---	---	---	<0.05	---	---	---	---	---	0.08	---	3.6	---	100
8/4/2002	OSF	101	8.4	---	---	---	---	<0.05	---	---	---	---	---	<0.02	---	3.5	---	113
8/4/2002	OSF	92	6.8	---	---	---	---	0.07	---	---	---	---	---	0.06	---	5.3	---	137
8/4/2002	OSF	105	9.9	---	---	---	---	0.06	---	---	---	---	---	0.14	---	4.0	---	107

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Appendix A3 Page 23 of 31.–Red Dog Mine, Red Dog Mainstem (RDM) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/7/1998	RDM	132	---	---	---	---	---	1.97	---	---	---	---	---	5.04	---	6.5	---	---
8/7/1998	RDM	145	---	---	---	---	---	3.62	---	---	---	---	---	15.00	---	7.3	---	---
8/7/1998	RDM	124	---	---	---	---	---	3.62	---	---	---	---	---	16.20	---	6.4	---	---
8/7/1998	RDM	124	---	---	---	---	---	3.04	---	---	---	---	---	10.60	---	5.2	---	---
8/7/1998	RDM	110	---	---	---	---	---	3.07	---	---	---	---	---	6.97	---	5.7	---	---
8/7/1998	RDM	130	---	---	---	---	---	1.89	---	---	---	---	---	4.17	---	7.3	---	---
8/7/1998	RDM	143	---	---	---	---	---	0.42	---	---	---	---	---	3.95	---	6.9	---	---
8/7/1998	RDM	130	---	---	---	---	---	2.54	---	---	---	---	---	21.20	---	8.7	---	---
8/7/1998	RDM	132	---	---	---	---	---	3.08	---	---	---	---	---	6.48	---	7.3	---	---
8/7/1998	RDM	132	---	---	---	---	---	1.04	---	---	---	---	---	7.97	---	7.6	---	---
8/10/1999	RDM	140	---	---	---	---	---	4.62	---	---	---	---	---	8.91	---	6.9	---	---
8/10/1999	RDM	121	---	---	---	---	---	3.90	---	---	---	---	---	8.78	---	7.1	---	---
8/10/1999	RDM	125	---	---	---	---	---	3.75	---	---	---	---	---	8.68	---	8.9	---	---
8/10/1999	RDM	127	---	---	---	---	---	4.14	---	---	---	---	---	3.11	---	7.3	---	---
8/10/1999	RDM	130	---	---	---	---	---	3.19	---	---	---	---	---	4.97	---	6.9	---	---
8/10/1999	RDM	134	---	---	---	---	---	1.28	---	---	---	---	---	3.18	---	7.3	---	---
8/10/1999	RDM	139	---	---	---	---	---	3.84	---	---	---	---	---	6.52	---	8.9	---	---
8/10/1999	RDM	145	---	---	---	---	---	3.17	---	---	---	---	---	10.40	---	6.3	---	---
8/10/1999	RDM	143	---	---	---	---	---	0.54	---	---	---	---	---	1.09	---	5.7	---	---
8/10/1999	RDM	120	---	---	---	---	---	2.47	---	---	---	---	---	9.94	---	4.2	---	---
7/28/2000	RDM	131	17.9	---	---	---	---	2.69	---	---	---	---	---	6.80	---	6.8	---	---
7/28/2000	RDM	117	12.3	---	---	---	---	3.45	---	---	---	---	---	13.00	---	10.8	---	---
7/28/2000	RDM	140	21.8	---	---	---	---	4.75	---	---	---	---	---	9.75	---	9.1	---	---
7/28/2000	RDM	110	11.2	---	---	---	---	2.91	---	---	---	---	---	13.40	---	12.5	---	---
7/28/2000	RDM	125	16.0	---	---	---	---	6.40	---	---	---	---	---	15.80	---	8.9	---	---

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Appendix A3 Page 24 of 31.–Red Dog Mine, Red Dog Mainstem (RDM) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/31/2001	RDM	92	6.9	---	---	---	---	5.92	---	---	---	---	---	46.60	---	12.3	---	333
7/31/2001	RDM	133	16.1	---	---	---	---	3.88	---	---	---	---	---	16.80	---	7.6	---	244
7/31/2001	RDM	94	6.2	---	---	---	---	3.42	---	---	---	---	---	25.00	---	15.2	---	327
7/31/2001	RDM	132	16.0	---	---	---	---	1.15	---	---	---	---	---	1.95	---	6.7	---	117
7/31/2001	RDM	134	21.7	---	---	---	---	3.83	---	---	---	---	---	9.79	---	14.4	---	210
7/31/2001	RDM	117	12.7	---	---	---	---	2.78	---	---	---	---	---	4.43	---	10.5	---	226
7/31/2001	RDM	106	9.7	---	---	---	---	2.80	---	---	---	---	---	5.62	---	11.1	---	210
7/31/2001	RDM	106	9.3	---	---	---	---	3.52	---	---	---	---	---	11.40	---	13.1	---	188
7/28/2002	RDM	112	14.0	---	---	---	---	6.63	---	---	---	---	---	20.70	---	9.4	---	271
7/28/2002	RDM	100	11.8	---	---	---	---	5.62	---	---	---	---	---	8.89	---	13.0	---	276
7/28/2002	RDM	127	20.3	---	---	---	---	6.16	---	---	---	---	---	14.60	---	16.1	---	404
7/28/2002	RDM	128	20.5	---	---	---	---	6.17	---	---	---	---	---	29.20	---	12.7	---	402
7/28/2002	RDM	90	6.2	---	---	---	---	1.83	---	---	---	---	---	6.77	---	6.6	---	195
7/28/2002	RDM	106	10.9	---	---	---	---	3.39	---	---	---	---	---	9.33	---	13.0	---	230
7/28/2002	RDM	104	10.9	---	---	---	---	4.82	---	---	---	---	---	8.39	---	17.2	---	314
7/28/2002	RDM	98	8.7	---	---	---	---	3.13	---	---	---	---	---	6.42	---	17.0	---	210
7/28/2002	RDM	119	16.7	---	---	---	---	2.82	---	---	---	---	---	5.00	---	14.2	---	205
7/28/2002	RDM	95	9.0	---	---	---	---	3.65	---	---	---	---	---	16.90	---	9.2	---	218
7/29/2002	RDM	134	23.2	---	---	---	---	3.05	---	---	---	---	---	8.40	---	9.8	---	219
7/29/2002	RDM	116	13.2	---	---	---	---	2.31	---	---	---	---	---	5.26	---	8.7	---	180
7/29/2002	RDM	99	9.7	---	---	---	---	2.64	---	---	---	---	---	3.02	---	11.2	---	218
7/29/2002	RDM	100	10.6	---	---	---	---	3.11	---	---	---	---	---	8.12	---	13.3	---	221
7/29/2002	RDM	96	8.4	---	---	---	---	2.04	---	---	---	---	---	10.10	---	8.2	---	177
8/8/2003	RDM	150	30.0	---	---	---	---	4.98	---	---	---	---	---	10.70	---	11.8	---	233
8/8/2003	RDM	128	16.7	---	---	---	---	5.48	---	---	---	---	---	8.40	---	11.5	---	208
8/10/2003	RDM	112	13.5	---	---	---	---	6.56	---	---	---	---	---	15.20	---	10.1	---	271
8/10/2003	RDM	111	13.6	---	---	---	---	3.86	---	---	---	---	---	2.42	---	10.0	---	220
8/10/2003	RDM	119	15.5	---	---	---	---	3.41	---	---	---	---	---	1.72	---	10.1	---	166
8/10/2003	RDM	108	12.0	---	---	---	---	2.82	---	---	---	---	---	3.41	---	10.0	---	197

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Appendix A3 Page 25 of 31.–Red Dog Mine, Red Dog Mainstem (RDM) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/10/2003	RDM	106	11.3	---	---	---	---	5.92	---	---	---	---	---	9.26	---	10.4	---	331
8/10/2003	RDM	108	11.2	---	---	---	---	4.65	---	---	---	---	---	4.51	---	11.0	---	212
8/10/2003	RDM	112	12.3	---	---	---	---	2.96	---	---	---	---	---	4.66	---	8.5	---	185
8/10/2003	RDM	118	16.3	---	---	---	---	5.15	---	---	---	---	---	16.30	---	12.7	---	258
8/10/2003	RDM	111	11.9	---	---	---	---	4.37	---	---	---	---	---	12.70	---	9.6	---	234
8/10/2003	RDM	109	11.6	---	---	---	---	1.29	---	---	---	---	---	1.87	---	10.1	---	153
8/10/2003	RDM	106	15.5	---	---	---	---	1.86	---	---	---	---	---	0.97	---	8.2	---	140
8/10/2003	RDM	110	12.8	---	---	---	---	3.53	---	---	---	---	---	4.42	---	13.7	---	249
8/20/2004	RDM	91	6.5	---	---	---	---	4.72	---	---	0.060	---	---	24.70	---	5.7	---	265
8/20/2004	RDM	110	10.7	---	---	---	---	1.23	---	---	0.030	---	---	2.40	---	3.9	---	208
8/27/2004	RDM	128	18.1	---	---	---	---	0.76	---	---	<0.020	---	---	1.63	---	3.2	---	120
8/27/2004	RDM	116	11.8	---	---	---	---	3.74	---	---	0.040	---	---	147.00	---	6.8	---	282
7/28/2005	RDM	109	11.5	---	---	---	---	3.48	---	---	0.030	---	---	3.05	---	10.8	---	167
7/28/2005	RDM	111	11.8	---	---	---	---	2.50	---	---	0.020	---	---	2.06	---	9.7	---	173
7/28/2005	RDM	123	16.4	---	---	---	---	1.48	---	---	0.030	---	---	2.72	---	8.5	---	176
7/28/2005	RDM	131	19.0	---	---	---	---	1.40	---	---	0.040	---	---	2.13	---	9.8	---	159
7/28/2005	RDM	116	15.8	---	---	---	---	1.66	---	---	0.030	---	---	1.63	---	7.8	---	190
7/28/2005	RDM	103	11.0	---	---	---	---	2.87	---	---	0.040	---	---	7.03	---	7.7	---	214
7/29/2005	RDM	122	15.9	---	---	---	---	1.67	---	---	0.030	---	---	1.91	---	10.2	---	147
7/29/2005	RDM	107	12.5	---	---	---	---	2.11	---	---	0.030	---	---	0.95	---	9.2	---	166
7/29/2005	RDM	119	15.9	---	---	---	---	3.27	---	---	0.030	---	---	1.93	---	9.6	---	171
7/29/2005	RDM	109	13.2	---	---	---	---	1.71	---	---	0.040	---	---	1.62	---	8.7	---	199
7/29/2005	RDM	136	22.9	---	---	---	---	2.09	---	---	0.020	---	---	1.73	---	9.5	---	163
7/29/2005	RDM	107	11.3	---	---	---	---	1.60	---	---	0.030	---	---	2.19	---	4.6	---	202
7/29/2005	RDM	114	13.0	---	---	---	---	2.74	---	---	0.020	---	---	0.78	---	8.8	---	145
7/29/2005	RDM	106	10.9	---	---	---	---	1.96	---	---	0.040	---	---	1.72	---	7.6	---	181
7/29/2005	RDM	113	14.7	---	---	---	---	1.87	---	---	0.030	---	---	1.05	---	8.7	---	164

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Appendix A3 Page 26 of 31.–Red Dog Mine, Red Dog Mainstem (RDM) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/11/2006	RDM	109	11.9	---	---	---	---	3.15	---	---	0.040	---	---	1.84	---	5.7	---	288
8/11/2006	RDM	110	14.5	---	---	---	---	3.00	---	---	0.040	---	---	5.49	---	6.9	---	349
8/11/2006	RDM	108	11.8	---	---	---	---	2.80	---	---	0.040	---	---	1.15	---	6.2	---	284
8/12/2006	RDM	94	8.3	---	---	---	---	4.52	---	---	0.060	---	---	12.00	---	6.3	---	569
8/12/2006	RDM	112	13.2	---	---	---	---	3.35	---	---	0.040	---	---	3.99	---	8.0	---	305
8/12/2006	RDM	110	13.3	---	---	---	---	3.68	---	---	0.030	---	---	4.81	---	6.6	---	229
8/12/2006	RDM	112	13.1	---	---	---	---	2.18	---	---	0.040	---	---	1.28	---	7.4	---	260
8/12/2006	RDM	108	11.0	---	---	---	---	2.28	---	---	0.030	---	---	1.31	---	6.7	---	317
8/12/2006	RDM	127	18.6	---	---	---	---	1.77	---	---	0.050	---	---	1.53	---	7.4	---	294
8/12/2006	RDM	95	8.7	---	---	---	---	3.76	---	---	0.030	---	---	1.24	---	7.4	---	513
8/12/2006	RDM	102	9.8	---	---	---	---	3.17	---	---	0.020	---	---	16.00	---	6.4	---	529
8/10/2007	RDM	124	15.7	---	---	---	---	5.88	---	---	0.030	---	---	13.30	---	7.4	---	540
8/10/2007	RDM	110	11.8	---	---	---	---	5.58	---	---	0.030	---	---	2.89	---	6.2	---	463
8/10/2007	RDM	123	15.9	---	---	---	---	4.89	---	---	0.040	---	---	0.93	---	4.4	---	192
8/10/2007	RDM	78	4.4	---	---	---	---	1.06	---	---	0.040	---	---	0.87	---	2.6	---	239
8/10/2007	RDM	120	14.3	---	---	---	---	2.71	---	---	0.040	---	---	3.00	---	5.5	---	220
8/11/2007	RDM	78	4.3	---	---	---	---	6.35	---	---	0.030	---	---	3.26	---	6.8	---	359
8/12/2007	RDM	119	15.3	---	---	---	---	5.43	---	---	0.060	---	---	20.90	---	4.9	---	497
8/12/2007	RDM	107	11.8	---	---	---	---	1.88	---	---	<0.020	---	---	6.32	---	3.3	---	351
8/12/2007	RDM	63	2.0	---	---	---	---	1.19	---	---	<0.180	---	---	2.75	---	3.5	---	250
8/12/2007	RDM	65	2.3	---	---	---	---	0.72	---	---	<0.020	---	---	1.24	---	2.9	---	176
8/12/2007	RDM	65	2.4	---	---	---	---	1.83	---	---	<0.020	---	---	1.70	---	4.5	---	366
8/4/2008	RDM	95	5.7	---	---	---	---	2.01	---	---	0.030	---	---	1.43	---	5.6	---	233
8/4/2008	RDM	118	12.2	---	---	---	---	0.89	---	---	0.040	---	---	0.46	---	4.1	---	247
8/4/2008	RDM	108	9.2	---	---	---	---	3.21	---	---	0.050	---	---	2.37	---	4.9	---	220
8/4/2008	RDM	108	10.5	---	---	---	---	2.05	---	---	0.060	---	---	0.67	---	4.8	---	166
8/4/2008	RDM	115	13.4	---	---	---	---	1.76	---	---	0.040	---	---	2.96	---	5.3	---	291
8/4/2008	RDM	108	17.6	---	---	---	---	1.63	---	---	0.060	---	---	6.41	---	4.4	---	218
8/4/2008	RDM	118	21.6	---	---	---	---	2.99	---	---	0.060	---	---	2.77	---	7.4	---	300

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Appendix A3 Page 27 of 31.–Red Dog Mine, Red Dog Mainstem (RDM) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/4/2008	RDM	102	16.2	---	---	---	---	1.47	---	---	0.040	---	---	1.63	---	7.1	---	229
8/4/2008	RDM	100	15.9	---	---	---	---	1.27	---	---	0.030	---	---	1.40	---	5.7	---	223
8/4/2008	RDM	113	20.2	---	---	---	---	2.30	---	---	0.040	---	---	2.58	---	7.1	---	236
8/4/2008	RDM	96	14.4	---	---	---	---	1.67	---	---	0.030	---	---	1.53	---	6.3	---	215
8/4/2008	RDM	104	15.5	---	---	---	---	1.55	---	---	0.050	---	---	1.82	---	4.9	---	259
8/4/2008	RDM	93	13.6	---	---	---	---	2.32	---	---	0.030	---	---	2.32	---	5.6	---	290
8/4/2008	RDM	118	22.2	---	---	---	---	1.94	---	---	0.030	---	---	3.77	---	6.3	---	263
8/4/2008	RDM	97	14.9	---	---	---	---	2.56	---	---	0.030	---	---	9.92	---	5.5	---	274
7/30/2009	RDM	67	2.0	---	---	---	---	1.16	---	---	<0.100	---	---	0.99	---	4.4	---	199
7/30/2009	RDM	93	6.5	---	---	---	---	1.45	---	---	0.030	---	---	1.33	---	10.9	---	172
7/30/2009	RDM	84	5.0	---	---	---	---	0.79	---	---	0.030	---	---	1.10	---	5.6	---	140
7/30/2009	RDM	57	1.5	---	---	---	---	0.51	---	---	<0.110	---	---	0.33	---	3.9	---	180
7/30/2009	RDM	83	5.0	---	---	---	---	1.46	---	---	0.030	---	---	1.57	---	3.9	---	160
7/30/2009	RDM	98	6.5	---	---	---	---	0.60	---	---	0.040	---	---	0.40	---	4.1	---	166
7/30/2009	RDM	80	7.0	---	---	---	---	0.31	---	---	0.030	---	---	0.57	---	3.4	---	121
7/30/2009	RDM	113	12.5	---	---	---	---	3.15	---	---	0.030	---	---	2.35	---	9.5	---	139
7/30/2009	RDM	112	12.0	---	---	---	---	1.54	---	---	0.030	---	---	1.40	---	11.8	---	136
7/30/2009	RDM	99	9.5	---	---	---	---	0.51	---	---	0.020	---	---	0.23	---	4.0	---	167
7/30/2009	RDM	105	10.0	---	---	---	---	1.35	---	---	0.040	---	---	0.78	---	11.2	---	162
7/30/2009	RDM	57	1.5	---	---	---	---	0.85	---	---	<0.100	---	---	0.83	---	3.4	---	156
7/30/2009	RDM	58	1.8	---	---	---	---	0.70	---	---	<0.110	---	---	1.14	---	3.6	---	156
7/30/2009	RDM	64	2.0	---	---	---	---	0.66	---	---	<0.100	---	---	0.81	---	3.5	---	154
7/30/2009	RDM	57	1.5	---	---	---	---	0.57	---	---	<0.100	---	---	5.04	---	3.2	---	164

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Appendix A3 Page 28 of 31.–Red Dog Mine, Red Dog Mainstem (RDM) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/16/2010	RDM	119	10.3	---	---	---	---	7.14	---	---	0.030	---	---	21.70	---	6.2	---	330
8/16/2010	RDM	128	14.5	---	---	---	---	2.85	---	---	0.030	---	---	7.61	---	5.9	---	175
8/16/2010	RDM	110	14.3	---	---	---	---	2.40	---	---	0.030	---	---	6.34	---	5.0	---	176
8/16/2010	RDM	127	20.3	---	---	---	---	2.50	---	---	0.040	---	---	2.72	---	6.8	---	225
8/16/2010	RDM	106	19.8	---	---	---	---	1.88	---	---	0.030	---	---	0.89	---	4.6	---	121
8/16/2010	RDM	122	19.0	---	---	---	---	2.42	---	---	0.030	---	---	3.55	---	5.7	---	186
8/16/2010	RDM	105	16.5	---	---	---	---	1.76	---	---	<0.020	---	---	1.25	---	5.1	---	141
8/16/2010	RDM	124	18.3	---	---	---	---	1.63	---	---	0.020	---	---	4.26	---	5.0	---	197
8/16/2010	RDM	112	21.3	---	---	---	---	3.91	---	---	0.060	---	---	12.50	---	6.1	---	218
8/16/2010	RDM	101	15.3	---	---	---	---	2.08	---	---	0.020	---	---	4.85	---	4.8	---	155
8/16/2010	RDM	141	19.5	---	---	---	---	2.54	---	---	0.030	---	---	1.26	---	5.0	---	163
8/16/2010	RDM	114	13.3	---	---	---	---	3.57	---	---	0.030	---	---	5.37	---	5.6	---	196
8/16/2010	RDM	125	17.3	---	---	---	---	3.65	---	---	0.040	---	---	12.60	---	3.9	---	173
8/16/2010	RDM	121	22.0	---	---	---	---	2.81	---	---	0.030	---	---	0.90	---	4.0	---	144
8/16/2010	RDM	119	15.8	---	---	---	---	3.66	---	---	0.030	---	---	5.40	---	4.5	---	201
8/27/2011	RDM	134	23.0	---	---	---	---	1.93	---	---	0.020	---	---	5.74	---	10.1	---	159
8/29/2011	RDM	132	22.5	---	---	---	---	1.92	---	---	<0.020	---	---	2.72	---	7.4	---	189
8/29/2011	RDM	93	9.0	---	---	---	---	3.39	---	---	<0.030	---	---	12.90	---	7.3	---	258
8/29/2011	RDM	122	16.5	---	---	---	---	1.59	---	---	0.020	---	---	6.82	---	5.8	---	182
8/29/2011	RDM	110	14.5	---	---	---	---	1.41	---	---	0.020	---	---	6.07	---	6.5	---	176
8/27/2011	RDM	102	10.5	---	---	---	---	1.00	---	---	<0.020	---	---	1.22	---	3.2	---	171
8/27/2011	RDM	103	12.0	---	---	---	---	1.83	---	---	0.020	---	---	0.85	---	3.8	---	173
8/27/2011	RDM	127	18.5	---	---	---	---	1.46	---	---	0.030	---	---	4.63	---	3.1	---	170
8/27/2011	RDM	109	11.5	---	---	---	---	2.16	---	---	0.040	---	---	1.54	---	5.2	---	149
8/27/2011	RDM	124	14.0	---	---	---	---	2.89	---	---	0.030	---	---	1.19	---	5.3	---	253
8/29/2011	RDM	134	24.5	---	---	---	---	2.76	---	---	0.020	---	---	7.69	---	10.3	---	175
8/29/2011	RDM	136	25.5	---	---	---	---	1.94	---	---	0.020	---	---	5.66	---	10.8	---	211

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Appendix A3 Page 29 of 31.–Red Dog Mine, Red Dog Mainstem (RDM) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/29/2014	RDM	130	19.0	---	---	---	---	1.10	---	7.2	0.030	---	---	7.09	---	6.3	---	182
7/28/2014	RDM	140	24.0	---	---	---	---	2.31	---	6.1	0.040	---	---	6.01	---	9.2	---	159
7/29/2014	RDM	130	18.5	---	---	---	---	1.47	---	5.1	0.030	---	---	3.33	---	7.9	---	182
7/29/2014	RDM	134	20.0	---	---	---	---	1.26	---	5.7	0.040	---	---	3.21	---	7.9	---	209
7/29/2014	RDM	127	19.0	---	---	---	---	1.07	---	6.1	0.030	---	---	15.30	---	9.7	---	160
7/29/2014	RDM	119	16.0	---	---	---	---	0.83	---	4.0	0.020	---	---	2.12	---	7.6	---	139
7/29/2014	RDM	125	18.5	---	---	---	---	0.88	---	5.6	0.030	---	---	5.96	---	7.3	---	152
7/29/2014	RDM	113	12.5	---	---	---	---	0.98	---	6.8	0.030	---	---	4.81	---	8.4	---	194
7/29/2014	RDM	89	6.0	---	---	---	---	1.04	---	5.7	0.030	---	---	1.10	---	7.3	---	220
7/29/2014	RDM	120	17.0	---	---	---	---	2.17	---	9.2	0.030	---	---	4.43	---	8.8	---	211
7/29/2014	RDM	94	8.0	---	---	---	---	1.36	---	6.6	0.030	---	---	8.80	---	8.9	---	166
7/29/2014	RDM	125	18.0	---	---	---	---	0.99	---	6.0	0.030	---	---	1.63	---	9.1	---	183
7/29/2014	RDM	117	14.0	---	---	---	---	1.59	---	7.2	0.070	---	---	3.13	---	7.7	---	183
7/30/2014	RDM	128	20.5	---	---	---	---	1.01	---	6.3	0.040	---	---	3.59	---	10.1	---	175
7/30/2014	RDM	117	15.0	---	---	---	---	2.58	---	8.9	0.070	---	---	6.13	---	9.4	---	232
8/1/2015	RDM	93	9.0	---	---	---	---	1.73	---	6.2	<0.020	---	---	5.50	---	9.1	---	186
8/1/2015	RDM	106	12.5	---	---	---	---	2.18	---	5.7	0.020	---	---	6.71	---	12.8	---	200
8/1/2015	RDM	98	12.5	---	---	---	---	1.73	---	5.3	<0.020	---	---	12.60	---	11.8	---	296
8/1/2015	RDM	120	15.0	---	---	---	---	2.37	---	5.9	<0.020	---	---	2.05	---	15.9	---	204
8/1/2015	RDM	122	18.5	---	---	---	---	1.96	---	4.8	0.020	---	---	6.56	---	12.3	---	205
8/1/2015	RDM	110	13.0	---	---	---	---	2.21	---	5.8	0.030	---	---	1.59	---	13.4	---	187
8/1/2015	RDM	99	10.0	---	---	---	---	0.96	---	4.8	<0.020	---	---	0.92	---	7.7	---	157
8/1/2015	RDM	105	11.5	---	---	---	---	1.50	---	5.5	<0.020	---	---	0.83	---	13.7	---	193
8/1/2015	RDM	114	15.5	---	---	---	---	1.04	---	4.8	0.020	---	---	0.95	---	14.5	---	163
8/1/2015	RDM	105	10.5	---	---	---	---	0.69	---	5.5	0.030	---	---	0.54	---	7.3	---	216
8/1/2015	RDM	98	9.5	---	---	---	---	1.50	---	5.2	0.030	---	---	0.99	---	12.9	---	225
8/1/2015	RDM	96	8.5	---	---	---	---	0.74	---	4.0	0.020	---	---	1.90	---	8.5	---	217
8/1/2015	RDM	114	16.0	---	---	---	---	1.67	---	6.3	0.030	---	---	1.28	---	10.4	---	180
8/1/2015	RDM	111	12.5	---	---	---	---	1.45	---	5.5	0.020	---	---	1.09	---	10.6	---	156
8/1/2015	RDM	105	12.5	---	---	---	---	1.28	---	5.6	0.030	---	---	2.24	---	11.2	---	235

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Appendix A3 Page 30 of 31.–Red Dog Mine, Red Dog North Fork (RDNF) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/25/1993	RDNF	136	24.0	---	---	---	---	0.80	---	---	---	---	---	0.26	---	---	---	---
8/25/1993	RDNF	133	24.0	---	---	---	---	0.79	---	---	---	---	---	0.18	---	---	---	---
8/25/1993	RDNF	117	15.0	---	---	---	---	0.35	---	---	---	---	---	0.25	---	---	---	---
8/25/1993	RDNF	119	15.0	---	---	---	---	2.37	---	---	---	---	---	0.32	---	---	---	---
8/25/1993	RDNF	130	21.0	---	---	---	---	0.67	---	---	---	---	---	0.34	---	---	---	---
8/25/1993	RDNF	131	19.0	---	---	---	---	0.75	---	---	---	---	---	0.58	---	---	---	---
8/12/1999	RDNF	140	---	---	---	---	---	0.42	---	---	---	---	---	0.52	---	4.7	---	---
8/12/1999	RDNF	123	---	---	---	---	---	0.88	---	---	---	---	---	0.86	---	5.2	---	---
8/12/1999	RDNF	128	---	---	---	---	---	0.56	---	---	---	---	---	0.22	---	4.4	---	---
8/12/1999	RDNF	128	---	---	---	---	---	0.58	---	---	---	---	---	0.57	---	4.2	---	---
8/12/1999	RDNF	125	---	---	---	---	---	0.43	---	---	---	---	---	0.31	---	5.5	---	---
8/12/1999	RDNF	134	---	---	---	---	---	0.42	---	---	---	---	---	0.28	---	5.8	---	---
8/12/1999	RDNF	146	---	---	---	---	---	0.52	---	---	---	---	---	0.57	---	4.3	---	---
8/12/1999	RDNF	119	---	---	---	---	---	0.50	---	---	---	---	---	0.30	---	4.6	---	---
8/12/1999	RDNF	126	---	---	---	---	---	1.15	---	---	---	---	---	0.29	---	5.7	---	---
8/12/1999	RDNF	126	---	---	---	---	---	0.38	---	---	---	---	---	0.32	---	5.1	---	---
7/28/2000	RDNF	136	21.2	---	---	---	---	0.78	---	---	---	---	---	1.38	---	6.4	---	---
7/28/2000	RDNF	142	24.1	---	---	---	---	0.37	---	---	---	---	---	0.36	---	5.2	---	---
7/28/2000	RDNF	132	17.4	---	---	---	---	0.73	---	---	---	---	---	0.99	---	6.2	---	---
7/28/2000	RDNF	132	17.6	---	---	---	---	0.54	---	---	---	---	---	0.90	---	5.7	---	---
7/28/2000	RDNF	137	22.1	---	---	---	---	0.43	---	---	---	---	---	0.89	---	6.1	---	---

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Appendix A3 Page 31 of 31.–Red Dog Mine, Red Dog North Fork Upstream (RDNFU) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
8/1/2001	RDNFU	113	11.4	---	---	---	---	1.21	---	---	---	---	---	1.27	---	7.7	---	183
8/1/2001	RDNFU	130	15.9	---	---	---	---	1.45	---	---	---	---	---	2.37	---	8.0	---	154
8/1/2001	RDNFU	138	25.4	---	---	---	---	2.28	---	---	---	---	---	4.41	---	11.4	---	236
8/2/2002	RDNFU	139	27.1	---	---	---	---	0.24	---	---	---	---	---	0.66	---	6.6	---	113
8/2/2002	RDNFU	133	22.4	---	---	---	---	0.29	---	---	---	---	---	0.55	---	6.4	---	114
8/2/2002	RDNFU	128	20.4	---	---	---	---	0.59	---	---	---	---	---	0.98	---	6.5	---	131
8/2/2002	RDNFU	95	8.1	---	---	---	---	0.47	---	---	---	---	---	0.21	---	6.3	---	146
8/2/2002	RDNFU	129	18.6	---	---	---	---	0.60	---	---	---	---	---	0.25	---	5.5	---	127
8/2/2002	RDNFU	133	21.0	---	---	---	---	0.23	---	---	---	---	---	0.17	---	5.2	---	124
8/2/2002	RDNFU	116	19.2	---	---	---	---	0.69	---	---	---	---	---	0.36	---	6.0	---	118
8/2/2002	RDNFU	136	22.9	---	---	---	---	0.24	---	---	---	---	---	0.18	---	6.0	---	116
8/3/2002	RDNFU	141	30.3	---	---	---	---	0.71	---	---	---	---	---	0.79	---	7.2	---	156
8/3/2002	RDNFU	120	18.5	---	---	---	---	0.86	---	---	---	---	---	0.12	---	6.9	---	96
8/3/2002	RDNFU	115	14.1	---	---	---	---	0.42	---	---	---	---	---	0.30	---	7.0	---	115
8/3/2002	RDNFU	130	21.3	---	---	---	---	0.88	---	---	---	---	---	1.42	---	7.2	---	176
8/3/2002	RDNFU	130	19.3	---	---	---	---	0.32	---	---	---	---	---	0.28	---	6.0	---	168
8/3/2002	RDNFU	98	11.4	---	---	---	---	0.65	---	---	---	---	---	0.38	---	6.5	---	168
8/3/2002	RDNFU	113	15.9	---	---	---	---	0.27	---	---	---	---	---	0.16	---	6.3	---	99
8/27/2004	RDNFU	117	15.9	---	---	---	---	0.27	---	---	0.060	---	---	0.11	---	6.5	---	116
8/27/2004	RDNFU	136	22.4	---	---	---	---	0.16	---	---	0.030	---	---	0.09	---	6.2	---	90

Appendix A4 Page 1 of 10.–Greens Creek Mine, Greens Creek site 48 (GC48) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/23/2001	GC48	131	26.0	0.02	---	---	---	1.76	---	8.3	---	---	---	0.20	---	6.1	---	180
7/23/2001	GC48	137	28.8	0.03	---	---	---	0.89	---	7.2	---	---	---	0.17	---	4.6	---	146
7/23/2001	GC48	119	18.8	0.02	---	---	---	2.27	---	5.7	---	---	---	0.20	---	6.2	---	189
7/23/2001	GC48	121	21.1	0.02	---	---	---	1.56	---	6.9	---	---	---	0.17	---	5.2	---	182
7/23/2001	GC48	111	13.7	0.03	---	---	---	0.89	---	4.7	---	---	---	0.23	---	5.4	---	138
7/23/2001	GC48	121	21.1	<0.02	---	---	---	1.26	---	7.4	---	---	---	0.10	---	5.6	---	157
7/24/2002	GC48	133	23.2	0.03	---	---	---	1.64	---	6.8	---	---	---	0.72	---	4.8	---	239
7/24/2002	GC48	120	15.0	0.07	---	---	---	0.85	---	7.0	---	---	---	0.28	---	4.1	---	210
7/24/2002	GC48	122	17.5	0.03	---	---	---	0.74	---	4.3	---	---	---	0.17	---	4.9	---	162
7/24/2002	GC48	127	20.8	0.04	---	---	---	1.40	---	6.1	---	---	---	0.16	---	4.7	---	185
7/24/2002	GC48	134	24.8	0.05	---	---	---	1.30	---	7.9	---	---	---	0.46	---	4.3	---	208
7/24/2002	GC48	128	21.7	0.04	---	---	---	1.56	---	6.8	---	---	---	0.22	---	5.7	---	343
7/22/2003	GC48	90	8.9	<0.02	---	---	---	0.65	---	4.2	---	---	---	0.14	---	5.6	---	191
7/22/2003	GC48	98	9.9	<0.02	---	---	---	0.90	---	5.1	---	---	---	0.22	---	5.5	---	180
7/22/2003	GC48	103	12.1	<0.02	---	---	---	0.82	---	5.6	---	---	---	0.16	---	5.4	---	241
7/22/2003	GC48	112	12.5	<0.02	---	---	---	0.78	---	6.1	---	---	---	0.11	---	6.1	---	192
7/22/2003	GC48	108	11.9	<0.02	---	---	---	0.63	---	3.9	---	---	---	0.14	---	5.2	---	174
7/22/2003	GC48	100	10.5	<0.02	---	---	---	0.58	---	3.7	---	---	---	0.08	---	5.5	---	218
7/22/2004	GC48	96	8.6	<0.02	---	---	---	0.63	---	4.7	---	---	---	0.15	---	4.3	---	206
7/22/2004	GC48	88	6.8	<0.02	---	---	---	0.83	---	5.6	---	---	---	0.26	---	4.0	---	175
7/22/2004	GC48	101	11.5	<0.02	---	---	---	1.54	---	4.6	---	---	---	0.21	---	4.1	---	183
7/22/2004	GC48	98	9.3	<0.02	---	---	---	0.80	---	5.2	---	---	---	0.28	---	3.7	---	168
7/22/2004	GC48	93	7.6	<0.02	---	---	---	1.25	---	4.4	---	---	---	0.14	---	6.4	---	220
7/22/2004	GC48	91	7.5	0.03	---	---	---	1.01	---	4.5	---	---	---	0.29	---	5.6	---	323
7/22/2005	GC48	103	19.7	0.02	---	---	---	0.66	---	4.4	---	---	---	0.44	---	4.2	---	183
7/22/2005	GC48	96	13.1	<0.02	---	---	---	0.84	---	14.5	---	---	---	0.98	---	4.8	---	220
7/22/2005	GC48	119	15.6	0.02	---	---	---	0.89	---	4.4	---	---	---	0.66	---	4.8	---	226
7/22/2005	GC48	114	17.1	0.02	---	---	---	0.59	---	6.0	---	---	---	0.32	---	4.8	---	178
7/22/2005	GC48	111	15.3	0.03	---	---	---	1.10	---	18.8	---	---	---	0.79	---	4.6	---	217
7/22/2005	GC48	125	16.9	0.03	---	---	---	0.47	---	3.6	---	---	---	0.36	---	3.8	---	161

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Appendix A4 Page 2 of 10.–Greens Creek Mine, Greens Creek site 48 (GC48) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/20/2006	GC48	110	15.8	0.04	---	---	---	0.56	---	8.5	---	---	---	0.37	---	5.4	---	244
7/20/2006	GC48	110	15.4	0.05	---	---	---	1.20	---	8.3	---	---	---	0.31	---	6.0	---	217
7/20/2006	GC48	113	16.1	0.04	---	---	---	0.65	---	6.3	---	---	---	0.24	---	5.4	---	264
7/20/2006	GC48	132	25.0	0.06	---	---	---	0.63	---	8.1	---	---	---	0.66	---	5.2	---	232
7/20/2006	GC48	104	12.8	0.08	---	---	---	0.96	---	8.5	---	---	---	0.37	---	5.1	---	283
7/20/2006	GC48	114	16.7	0.03	---	---	---	0.63	---	5.3	---	---	---	0.20	---	5.1	---	270
7/21/2007	GC48	122	17.9	0.03	---	---	---	1.16	---	5.5	---	---	---	0.17	---	5.5	---	221
7/21/2007	GC48	95	10.4	0.02	---	---	---	1.42	---	3.9	---	---	---	0.29	---	5.8	---	165
7/21/2007	GC48	135	22.8	0.09	---	---	---	1.35	---	14.1	---	---	---	1.37	---	5.3	---	166
7/21/2007	GC48	98	9.9	0.03	---	---	---	0.96	---	5.7	---	---	---	0.27	---	5.2	---	269
7/21/2007	GC48	105	13.2	0.11	---	---	---	1.79	---	11.4	---	---	---	1.62	---	5.4	---	323
7/21/2007	GC48	99	10.0	0.04	---	---	---	1.43	---	5.2	---	---	---	0.31	---	5.7	---	208
7/22/2008	GC48	112	16.4	0.07	---	---	---	1.23	---	5.2	---	---	---	0.95	---	5.72	---	289
7/22/2008	GC48	123	21.3	0.04	---	---	---	0.79	---	3.9	---	---	---	0.57	---	4.56	---	194
7/22/2008	GC48	105	14.0	0.08	---	---	---	0.82	---	4.6	---	---	---	0.52	---	5.88	---	200
7/22/2008	GC48	124	20.6	0.04	---	---	---	0.87	---	4.9	---	---	---	0.42	---	6.31	---	244
7/22/2008	GC48	115	16.9	0.03	---	---	---	1.36	---	5.3	---	---	---	0.51	---	5.36	---	254
7/22/2008	GC48	122	19.8	0.04	---	---	---	1.07	---	5.6	---	---	---	0.38	---	6.11	---	260
7/21/2009	GC48	120	20.1	<0.02	---	---	---	1.05	---	5.2	---	---	---	0.22	---	5.9	---	186
7/21/2009	GC48	121	20.7	<0.02	---	---	---	1.40	---	5.3	---	---	---	0.44	---	5.7	---	173
7/21/2009	GC48	119	17.9	0.02	---	---	---	1.10	---	4.5	---	---	---	0.13	---	5.9	---	182
7/21/2009	GC48	108	13.6	<0.02	---	---	---	1.20	---	4.1	---	---	---	0.15	---	5.7	---	162
7/21/2009	GC48	109	14.6	<0.02	---	---	---	1.50	---	4.9	---	---	---	0.17	---	5.9	---	186
7/21/2009	GC48	110	15.2	<0.02	---	---	---	0.84	---	3.8	---	---	---	0.18	---	6.1	---	202
7/21/2010	GC48	103	11.9	0.02	---	---	---	1.56	---	4.8	0.09	---	---	0.16	---	5.0	---	226
7/21/2010	GC48	109	16.1	<0.02	---	---	---	0.50	---	3.0	0.15	---	---	0.20	---	5.4	---	170
7/21/2010	GC48	108	13.9	0.04	---	---	---	0.91	---	4.2	0.17	---	---	0.30	---	5.0	---	180
7/21/2010	GC48	105	13.8	<0.02	---	---	---	0.98	---	3.4	0.13	---	---	0.09	---	4.6	---	163
7/21/2010	GC48	98	10.8	0.06	---	---	---	0.90	---	4.8	0.14	---	---	0.46	---	4.8	---	213
7/21/2010	GC48	93	9.1	<0.02	---	---	---	0.96	---	3.6	0.10	---	---	0.09	---	4.0	---	156

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Appendix A4 Page 3 of 10.–Greens Creek Mine, Greens Creek site 48 (GC48) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/22/2011	GC48	88-112	---	0.03	---	---	---	1.12	---	5.7	---	---	---	0.28	---	6.2	---	221
7/24/2012	GC48	109	11.3	0.03	---	---	---	2.26	---	27.0	0.134	---	---	0.16	---	5.5	---	186
7/24/2012	GC48	123	18.3	0.03	---	---	---	1.37	---	4.9	0.122	---	---	0.10	---	5.7	---	184
7/24/2012	GC48	110	9.8	0.03	---	---	---	1.83	---	25.6	0.159	---	---	2.59	---	5.6	---	275
7/24/2012	GC48	103	10.6	0.03	---	---	---	0.99	---	76.8	0.175	---	---	0.30	---	5.1	---	189
7/24/2012	GC48	104	10.7	0.03	---	---	---	2.66	---	84.8	0.122	---	---	1.05	---	6.3	---	242
7/24/2012	GC48	116	15.8	0.04	---	---	---	0.73	---	35.1	0.148	---	---	1.03	---	4.7	---	190
7/25/2013	GC48	145	20.6	<0.02	---	---	---	0.68	---	3.7	0.214	---	---	0.17	---	5.3	---	237
7/25/2013	GC48	115	17.9	0.07	---	---	---	0.97	---	6.1	0.238	---	---	0.24	---	5.8	---	239
7/25/2013	GC48	115	14.3	<0.02	---	---	---	0.81	---	4.0	0.180	---	---	0.08	---	6.7	---	258
7/25/2013	GC48	105	11.4	<0.02	---	---	---	0.68	---	3.2	0.213	---	---	0.14	---	6.4	---	213
7/25/2013	GC48	109	13.0	0.04	---	---	---	2.01	---	6.6	0.113	---	---	0.36	---	6.2	---	271
7/25/2013	GC48	105	12.4	0.04	---	---	---	1.75	---	5.7	0.274	---	---	0.22	---	6.2	---	287
7/25/2014	GC48	110	13.0	0.04	---	---	---	0.55	---	4.5	0.146	---	---	0.11	---	5.3	---	234
7/25/2014	GC48	100	10.5	<0.02	---	---	---	0.93	---	4.2	0.148	---	---	0.19	---	6.9	---	213
7/25/2014	GC48	106	10.7	<0.02	---	---	---	1.22	---	4.8	0.199	---	---	0.38	---	5.7	---	232
7/25/2014	GC48	105	11.3	<0.02	---	---	---	1.45	---	4.2	0.122	---	---	0.44	---	6.1	---	193
7/25/2014	GC48	100	10.4	<0.02	---	---	---	0.92	---	4.5	0.134	---	---	0.06	---	4.9	---	237
7/25/2014	GC48	120	14.8	0.04	---	---	---	0.75	---	5.5	0.260	---	---	0.18	---	5.9	---	305
7/16/2015	GC48	105	12.4	<0.02	---	---	---	0.60	---	2.5	0.114	---	---	0.13	---	6.2	---	159
7/16/2015	GC48	104	11.7	0.04	---	---	---	1.11	---	10.7	0.100	---	---	1.30	---	5.8	---	205
7/16/2015	GC48	100	11.7	0.03	---	---	---	1.05	---	3.8	0.152	---	---	0.14	---	6.1	---	187
7/16/2015	GC48	105	11.3	0.03	---	---	---	1.39	---	4.2	0.154	---	---	0.36	---	6.1	---	198
7/16/2015	GC48	105	12.7	<0.02	---	---	---	1.06	---	4.0	0.128	---	---	0.12	---	5.7	---	169
7/16/2015	GC48	100	10.4	0.02	---	---	---	1.49	---	3.9	0.165	---	---	0.37	---	5.4	---	191
7/16/2015	GC48	104	9.6	<0.02	---	---	---	0.85	---	3.1	0.091	---	---	0.09	---	5.2	---	175
7/16/2015	GC48	85	8.6	0.03	---	---	---	0.90	---	3.6	0.139	---	---	0.27	---	5.9	---	172
7/16/2015	GC48	102	10.3	<0.02	---	---	---	1.51	---	3.7	0.180	---	---	0.15	---	7.2	---	192
7/16/2015	GC48	120	16.3	<0.02	---	---	---	0.86	---	4.0	0.150	---	---	0.14	---	6.4	---	223

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Appendix A4 Page 4 of 10.–Greens Creek Mine, Greens Creek site 54 (GC54) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/23/2001	GC54	121	21.5	0.03	---	---	---	0.46	---	4.3	---	---	---	0.33	---	5.7	---	126
7/23/2001	GC54	119	19.3	0.02	---	---	---	0.21	---	3.2	---	---	---	0.22	---	3.6	---	82
7/23/2001	GC54	107	15.7	0.03	---	---	---	0.73	---	6.3	---	---	---	0.59	---	4.7	---	144
7/23/2001	GC54	109	13.6	0.02	---	---	---	0.82	---	5.4	---	---	---	0.86	---	4.9	---	172
7/23/2001	GC54	105	13.5	<0.02	---	---	---	0.79	---	6.5	---	---	---	0.45	---	5.8	---	203
7/23/2001	GC54	138	27.5	<0.02	---	---	---	0.74	---	5.8	---	---	---	0.40	---	5.4	---	171
7/24/2002	GC54	118	18.0	0.03	---	---	---	0.50	---	4.4	---	---	---	0.94	---	3.4	---	363
7/24/2002	GC54	128	22.3	0.03	---	---	---	0.52	---	4.5	---	---	---	0.35	---	4.7	---	150
7/24/2002	GC54	115	17.7	0.05	---	---	---	0.95	---	6.0	---	---	---	0.66	---	4.4	---	161
7/24/2002	GC54	115	18.9	0.03	---	---	---	1.03	---	5.2	---	---	---	0.66	---	4.2	---	216
7/24/2002	GC54	124	21.1	0.05	---	---	---	1.32	---	5.2	---	---	---	0.74	---	3.9	---	194
7/24/2002	GC54	123	20.9	0.02	---	---	---	0.70	---	3.9	---	---	---	0.78	---	4.4	---	195
7/22/2003	GC54	123	21.1	0.03	---	---	---	0.85	---	6.4	---	---	---	1.40	---	6.1	---	188
7/22/2003	GC54	101	10.6	<0.02	---	---	---	0.67	---	4.2	---	---	---	0.32	---	6.4	---	174
7/22/2003	GC54	88	9.2	<0.02	---	---	---	0.75	---	4.3	---	---	---	0.35	---	6.5	---	186
7/22/2003	GC54	109	14.8	<0.02	---	---	---	1.11	---	5.8	---	---	---	0.38	---	5.7	---	188
7/22/2003	GC54	95	10.6	<0.02	---	---	---	0.59	---	3.5	---	---	---	0.29	---	5.7	---	174
7/22/2003	GC54	92	9.7	<0.02	---	---	---	0.91	---	4.1	---	---	---	0.43	---	6.5	---	263
7/21/2004	GC54	103	9.9	0.02	---	---	---	0.79	---	11.0	---	---	---	0.57	---	4.6	---	232
7/21/2004	GC54	104	10.0	<0.02	---	---	---	0.88	---	5.5	---	---	---	0.54	---	5.0	---	206
7/21/2004	GC54	86	6.6	<0.02	---	---	---	1.26	---	5.1	---	---	---	0.36	---	5.3	---	164
7/21/2004	GC54	96	9.3	0.03	---	---	---	0.79	---	5.9	---	---	---	0.28	---	5.4	---	191
7/21/2004	GC54	93	9.9	<0.02	---	---	---	0.83	---	5.0	---	---	---	0.48	---	3.9	---	202
7/21/2004	GC54	104	12.9	0.08	---	---	---	1.12	---	7.0	---	---	---	0.93	---	4.9	---	217
7/22/2005	GC54	120	12.3	0.03	---	---	---	0.72	---	5.0	---	---	---	0.27	---	4.0	---	160
7/22/2005	GC54	106	12.1	0.02	---	---	---	0.63	---	4.5	---	---	---	0.13	---	3.9	---	200
7/22/2005	GC54	113	20.8	<0.02	---	---	---	0.73	---	8.8	---	---	---	0.17	---	4.7	---	223
7/22/2005	GC54	114	17.9	<0.02	---	---	---	0.82	---	9.7	---	---	---	0.17	---	3.9	---	222
7/22/2005	GC54	112	16.1	0.03	---	---	---	1.06	---	8.8	---	---	---	0.22	---	4.4	---	209
7/22/2005	GC54	118	22.3	0.02	---	---	---	0.55	---	5.5	---	---	---	0.39	---	3.9	---	185

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Appendix A4 Page 5 of 10.–Greens Creek Mine, Greens Creek site 54 (GC54) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/20/2006	GC54	137	27.3	0.06	---	---	---	0.42	---	4.8	---	---	---	0.51	---	5.7	---	208
7/20/2006	GC54	112	14.9	0.04	---	---	---	0.75	---	16.0	---	---	---	0.95	---	7.2	---	223
7/20/2006	GC54	102	12.0	0.02	---	---	---	0.93	---	22.2	---	---	---	0.52	---	6.3	---	239
7/20/2006	GC54	114	19.6	0.04	---	---	---	1.03	---	7.6	---	---	---	0.85	---	5.3	---	252
7/20/2006	GC54	98	12.3	0.08	---	---	---	0.54	---	10.9	---	---	---	0.48	---	5.4	---	223
7/20/2006	GC54	115	16.9	0.04	---	---	---	0.78	---	8.6	---	---	---	0.68	---	5.6	---	257
7/20/2007	GC54	102	11.8	0.04	---	---	---	0.88	---	5.3	---	---	---	0.54	---	5.6	---	157
7/20/2007	GC54	125	21.1	0.03	---	---	---	0.97	---	5.2	---	---	---	0.83	---	7.5	---	234
7/20/2007	GC54	97	10.7	0.06	---	---	---	0.81	---	5.7	---	---	---	0.89	---	8.6	---	185
7/20/2007	GC54	123	19.7	0.02	---	---	---	0.75	---	4.4	---	---	---	0.50	---	7.1	---	175
7/20/2007	GC54	104	12.5	0.03	---	---	---	0.92	---	5.6	---	---	---	0.57	---	7.8	---	174
7/20/2007	GC54	110	15.1	0.04	---	---	---	1.38	---	6.2	---	---	---	0.82	---	5.4	---	191
7/22/2008	GC54	123	21.9	0.04	---	---	---	0.66	---	5.3	---	---	---	0.26	---	5.53	---	185.0
7/22/2008	GC54	94	10.8	0.04	---	---	---	1.04	---	5.1	---	---	---	0.28	---	6.07	---	203.0
7/22/2008	GC54	123	21.5	0.03	---	---	---	1.53	---	4.9	---	---	---	3.46	---	6.29	---	261.0
7/22/2008	GC54	97	11.2	0.03	---	---	---	1.34	---	5.0	---	---	---	0.17	---	5.90	---	198.5
7/22/2008	GC54	108	16.0	0.05	---	---	---	1.98	---	6.3	---	---	---	0.23	---	5.97	---	220.0
7/22/2008	GC54	108	14.2	0.06	---	---	---	1.07	---	8.4	---	---	---	1.31	---	5.03	---	195.0
7/21/2009	GC54	132	26.9	0.04	---	---	---	1.10	---	4.8	---	---	---	0.33	---	5.4	---	213
7/21/2009	GC54	141	32.3	0.02	---	---	---	0.71	---	4.5	---	---	---	0.45	---	7.9	---	143
7/21/2009	GC54	116	17.9	<0.02	---	---	---	0.99	---	4.2	---	---	---	0.40	---	6.3	---	153
7/21/2009	GC54	117	17.7	0.03	---	---	---	1.00	---	5.9	---	---	---	0.39	---	6.8	---	200
7/21/2009	GC54	119	22.1	<0.02	---	---	---	1.20	---	4.0	---	---	---	0.28	---	6.5	---	176
7/21/2009	GC54	103	13.0	0.02	---	---	---	2.20	---	5.3	---	---	---	0.35	---	5.9	---	226
7/20/2010	GC54	115	16.0	<0.02	---	---	---	0.80	---	3.4	0.08	---	---	0.37	---	4.6	---	159
7/20/2010	GC54	112	12.8	0.02	---	---	---	0.67	---	3.1	0.09	---	---	0.34	---	3.7	---	154
7/20/2010	GC54	118	12.6	<0.02	---	---	---	0.98	---	3.6	0.12	---	---	0.25	---	5.2	---	190
7/20/2010	GC54	108	10.6	<0.02	---	---	---	1.31	---	3.8	0.10	---	---	0.16	---	4.1	---	212
7/20/2010	GC54	115	12.3	<0.02	---	---	---	1.73	---	5.0	0.12	---	---	0.36	---	4.4	---	222
7/20/2010	GC54	94	9.0	0.03	---	---	---	0.77	---	4.0	0.14	---	---	0.31	---	4.8	---	199

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Appendix A4 Page 6 of 10.–Greens Creek Mine, Greens Creek site 54 (GC54) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/21/2011	GC54	95-117	---	<0.02	---	---	---	0.95	---	4.5	---	---	---	0.32	---	5.6	---	191
7/23/2012	GC54	132	24.2	0.02	---	---	---	0.85	---	7.7	0.077	---	---	0.41	---	9.2	---	144
7/23/2012	GC54	118	17.3	0.04	---	---	---	1.03	---	7.7	0.109	---	---	0.57	---	6.3	---	199
7/23/2012	GC54	109	13.1	0.06	---	---	---	2.04	---	19.2	0.112	---	---	1.32	---	7.4	---	215
7/23/2012	GC54	97	9.1	0.03	---	---	---	2.04	---	65.6	0.126	---	---	0.50	---	6.2	---	227
7/23/2012	GC54	115	15.4	0.04	---	---	---	1.22	---	12.6	0.123	---	---	1.10	---	6.9	---	202
7/23/2012	GC54	119	18.3	0.03	---	---	---	1.81	---	5.3	0.080	---	---	0.27	---	5.1	---	191
7/24/2013	GC54	117	16.9	<0.02	---	---	---	1.39	---	4.2	0.131	---	---	0.30	---	5.6	---	247
7/24/2013	GC54	117	17.6	0.02	---	---	---	0.74	---	3.9	0.183	---	---	0.39	---	7.0	---	297
7/24/2013	GC54	94	11.3	<0.02	---	---	---	1.27	---	4.3	0.172	---	---	0.28	---	6.6	---	262
7/24/2013	GC54	118	18.9	<0.02	---	---	---	0.89	---	3.9	0.145	---	---	0.33	---	6.0	---	211
7/24/2013	GC54	105	10.3	0.02	---	---	---	1.18	---	5.3	0.108	---	---	0.27	---	6.4	---	245
7/24/2013	GC54	116	15.3	0.02	---	---	---	1.07	---	4.5	0.126	---	---	0.18	---	6.4	---	225
7/24/2014	GC54	125	21.2	0.08	---	---	---	0.93	---	12.7	0.121	---	---	1.55	---	5.7	---	212
7/25/2014	GC54	104	10.8	0.04	---	---	---	1.15	---	4.5	0.111	---	---	0.37	---	4.8	---	247
7/25/2014	GC54	110	11.5	0.21	---	---	---	0.85	---	4.3	0.119	---	---	0.30	---	6.2	---	291
7/25/2014	GC54	110	14.9	<0.02	---	---	---	0.69	---	4.8	0.113	---	---	0.25	---	5.9	---	248
7/25/2014	GC54	104	10.5	<0.02	---	---	---	1.03	---	5.0	0.106	---	---	0.28	---	5.7	---	250
7/25/2014	GC54	135	24.1	0.02	---	---	---	0.86	---	4.4	0.160	---	---	0.49	---	6.6	---	243
7/15/2015	GC54	110	11.3	0.02	---	---	---	0.92	---	4.7	0.121	---	---	0.59	---	6.3	---	236
7/15/2015	GC54	105	11.5	<0.02	---	---	---	0.52	---	2.5	0.116	---	---	0.36	---	7.0	---	117
7/15/2015	GC54	110	11.7	<0.02	---	---	---	0.67	---	3.0	0.106	---	---	0.36	---	6.4	---	171
7/15/2015	GC54	105	12.0	0.03	---	---	---	1.16	---	3.8	0.109	---	---	1.62	---	7.3	---	221
7/15/2015	GC54	100	10.7	<0.02	---	---	---	2.06	---	4.9	0.106	---	---	0.37	---	6.6	---	198
7/15/2015	GC54	95	8.4	<0.02	---	---	---	0.91	---	3.4	0.096	---	---	0.38	---	5.5	---	176
7/15/2015	GC54	100	8.2	<0.02	---	---	---	0.60	---	3.6	0.119	---	---	0.49	---	5.8	---	219
7/15/2015	GC54	92	9.9	0.02	---	---	---	0.84	---	4.7	0.072	---	---	0.47	---	6.5	---	153
7/15/2015	GC54	90	7.1	0.03	---	---	---	1.32	---	3.9	0.159	---	---	1.08	---	7.2	---	204
7/15/2015	GC54	88	6.2	0.02	---	---	---	1.13	---	4.0	0.119	---	---	0.39	---	6.4	---	179

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Appendix A4 Page 7 of 10.–Greens Creek Mine, Tributary Creek site 9 (TC9) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/21/2001	TC9	97	9.1	0.09	---	---	---	0.35	---	4.3	---	---	---	0.56	---	6.8	---	127
7/21/2001	TC9	97	9.7	0.10	---	---	---	0.77	---	5.2	---	---	---	0.67	---	8.0	---	118
7/21/2001	TC9	97	9.5	0.15	---	---	---	0.92	---	5.4	---	---	---	4.88	---	5.3	---	144
7/21/2001	TC9	98	10.4	0.15	---	---	---	0.86	---	6.7	---	---	---	2.19	---	---	---	99
7/21/2001	TC9	86	6.4	0.08	---	---	---	0.76	---	4.9	---	---	---	0.33	---	6.2	---	106
7/21/2001	TC9	93	7.8	0.06	---	---	---	0.37	---	12.0	---	---	---	0.38	---	6.8	---	122
7/24/2002	TC9	103	10.8	0.02	---	---	---	0.22	---	3.7	---	---	---	0.12	---	1.4	---	144
7/24/2002	TC9	97	10.4	0.07	---	---	---	1.20	---	5.5	---	---	---	1.66	---	3.3	---	172
7/24/2002	TC9	100	11.2	0.13	---	---	---	1.06	---	6.1	---	---	---	3.40	---	5.0	---	138
7/24/2002	TC9	90	7.9	0.23	---	---	---	1.29	---	7.1	---	---	---	4.08	---	5.2	---	168
7/24/2002	TC9	90	9.2	0.08	---	---	---	1.15	---	5.2	---	---	---	1.39	---	6.2	---	150
7/24/2002	TC9	100	9.3	0.04	---	---	---	0.84	---	3.2	---	---	---	0.33	---	5.4	---	152
7/23/2003	TC9	106	10.7	0.06	---	---	---	0.46	---	2.8	---	---	---	0.34	---	6.3	---	134
7/23/2003	TC9	89	6.8	0.10	---	---	---	1.01	---	4.0	---	---	---	0.82	---	6.0	---	131
7/23/2003	TC9	112	17.4	0.16	---	---	---	1.35	---	4.4	---	---	---	1.85	---	5.7	---	108
7/23/2003	TC9	95	11.6	0.19	---	---	---	0.69	---	5.6	---	---	---	1.30	---	3.6	---	136
7/23/2003	TC9	91	9.5	0.05	---	---	---	0.72	---	4.4	---	---	---	0.56	---	4.9	---	131
7/23/2003	TC9	84	8.4	0.12	---	---	---	0.76	---	3.9	---	---	---	0.78	---	4.7	---	125
7/21/2004	TC9	84	5.5	0.10	---	---	---	0.96	---	3.2	---	---	---	1.19	---	5.4	---	169
7/21/2004	TC9	96	8.5	0.10	---	---	---	1.24	---	3.8	---	---	---	0.67	---	5.9	---	138
7/21/2004	TC9	105	14.1	0.10	---	---	---	2.02	---	4.0	---	---	---	1.76	---	5.8	---	125
7/21/2004	TC9	85	5.8	0.04	---	---	---	0.47	---	3.7	---	---	---	0.93	---	4.8	---	175
7/21/2004	TC9	81	6.4	0.09	---	---	---	2.34	---	4.3	---	---	---	1.44	---	8.2	---	140
7/21/2004	TC9	86	10.4	0.11	---	---	---	0.83	---	5.5	---	---	---	0.97	---	5.8	---	161
7/23/2005	TC9	97	11.1	0.06	---	---	---	0.70	---	10.4	---	---	---	0.29	---	6.4	---	104
7/23/2005	TC9	113	16.8	0.10	---	---	---	0.63	---	4.7	---	---	---	0.97	---	6.1	---	122
7/23/2005	TC9	115	18.8	0.07	---	---	---	0.52	---	6.3	---	---	---	0.53	---	5.8	---	109
7/23/2005	TC9	117	20.5	0.19	---	---	---	0.79	---	9.9	---	---	---	1.07	---	6.7	---	117
7/23/2005	TC9	101	11.7	0.07	---	---	---	1.44	---	5.2	---	---	---	1.00	---	8.1	---	130
7/23/2005	TC9	107	13.7	0.10	---	---	---	1.29	---	4.6	---	---	---	0.46	---	8.0	---	134

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Appendix A4 Page 8 of 10.–Greens Creek Mine, Tributary Creek site 9 (TC9) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/21/2006	TC9	99	12.9	0.12	---	---	---	0.74	---	4.0	---	---	---	0.32	---	6.3	---	120
7/21/2006	TC9	96	11.6	0.12	---	---	---	0.76	---	7.7	---	---	---	1.32	---	6.8	---	157
7/21/2006	TC9	94	10.9	0.18	---	---	---	1.59	---	10.3	---	---	---	2.48	---	4.9	---	160
7/21/2006	TC9	100	10.9	0.11	---	---	---	1.34	---	8.5	---	---	---	1.46	---	5.2	---	142
7/21/2006	TC9	97	11.7	0.14	---	---	---	0.88	---	4.6	---	---	---	0.96	---	5.2	---	107
7/21/2006	TC9	117	20.8	0.24	---	---	---	1.29	---	4.3	---	---	---	2.92	---	5.9	---	130
7/20/2007	TC9	98	12.4	0.11	---	---	---	0.91	---	2.7	---	---	---	1.10	---	7.8	---	106
7/20/2007	TC9	89	8.9	0.12	---	---	---	1.72	---	3.3	---	---	---	1.80	---	5.6	---	136
7/20/2007	TC9	114	14.1	0.15	---	---	---	2.76	---	3.4	---	---	---	1.28	---	8.7	---	122
7/20/2007	TC9	81	7.1	0.14	---	---	---	1.90	---	4.2	---	---	---	2.03	---	7.0	---	114
7/20/2007	TC9	114	14.6	0.88	---	---	---	3.63	---	3.9	---	---	---	1.56	---	10.9	---	131
7/20/2007	TC9	93	10.6	0.14	---	---	---	1.50	---	20.3	---	---	---	3.80	---	9.4	---	107
7/23/2008	TC9	103	12.9	0.22	---	---	---	1.99	---	4.2	---	---	---	3.47	---	7.66	---	169
7/23/2008	TC9	108	14.8	0.10	---	---	---	0.96	---	3.2	---	---	---	0.86	---	5.82	---	143
7/23/2008	TC9	88	8.9	0.08	---	---	---	0.93	---	3.3	---	---	---	0.75	---	4.41	---	186
7/23/2008	TC9	86	9.3	0.22	---	---	---	1.91	---	5.7	---	---	---	4.06	---	5.71	---	119
7/23/2008	TC9	92	9.6	0.07	---	---	---	1.01	---	2.7	---	---	---	0.61	---	5.20	---	125
7/23/2008	TC9	90	8.7	0.03	---	---	---	0.54	---	2.2	---	---	---	0.43	---	4.80	---	108
7/22/2009	TC9	83	6.9	0.04	---	---	---	0.29	---	1.7	---	---	---	0.24	---	5.4	---	127
7/22/2009	TC9	91	8.6	0.06	---	---	---	0.55	---	2.1	---	---	---	0.16	---	5.1	---	137
7/22/2009	TC9	91	8.5	0.11	---	---	---	0.36	---	2.0	---	---	---	0.23	---	7.5	---	138
7/22/2009	TC9	98	10.3	0.09	---	---	---	0.81	---	3.4	---	---	---	0.38	---	5.8	---	147
7/22/2009	TC9	91	8.6	0.03	---	---	---	0.47	---	2.2	---	---	---	0.40	---	4.5	---	125
7/22/2009	TC9	90	7.8	0.06	---	---	---	0.60	---	2.2	---	---	---	0.38	---	5.6	---	129
7/20/2010	TC9	87	7.4	0.29	---	---	---	1.61	---	5.4	0.43	---	---	3.92	---	6.4	---	151
7/20/2010	TC9	94	10.9	0.12	---	---	---	0.82	---	2.5	0.58	---	---	0.24	---	5.7	---	174
7/20/2010	TC9	90	8.5	0.08	---	---	---	0.73	---	2.9	0.35	---	---	0.29	---	5.3	---	125
7/20/2010	TC9	90	8.2	0.06	---	---	---	0.60	---	2.3	0.27	---	---	0.33	---	4.7	---	151
7/20/2010	TC9	108	13.5	0.08	---	---	---	0.66	---	2.6	0.54	---	---	0.25	---	3.2	---	118
7/20/2010	TC9	105	11.6	0.08	---	---	---	0.75	---	3.1	0.27	---	---	0.23	---	3.9	---	150

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Appendix A4 Page 9 of 10.–Greens Creek Mine, Tributary Creek site 9 (TC9) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/21/2011	TC9	85-115	---	0.09	---	---	---	0.80	---	3.4	---	---	---	0.32	---	6.7	---	146
7/26/2012	TC9	89	7.3	<0.02	---	---	---	0.33	---	18.4	0.429	---	---	0.18	---	4.3	---	123
7/26/2012	TC9	122	16.5	0.03	---	---	---	0.60	---	8.4	0.257	---	---	0.54	---	4.8	---	126
7/26/2012	TC9	74,75	8.1	0.05	---	---	---	0.76	---	42.4	0.217	---	---	1.65	---	4.9	---	140
7/26/2012	TC9	105	11.7	0.13	---	---	---	0.57	---	22.6	0.241	---	---	0.74	---	7.5	---	128
7/26/2012	TC9	98	9.9	0.07	---	---	---	0.95	---	203.0	0.235	---	---	1.90	---	5.5	---	115
7/26/2012	TC9	86,112	20.2	0.06	---	---	---	0.53	---	8.5	0.278	---	---	0.67	---	5.3	---	116
7/23/2013	TC9	90	10.1	0.72	---	---	---	6.36	---	7.5	0.418	---	---	5.93	---	9.7	---	179
7/23/2013	TC9	92	10.4	0.27	---	---	---	1.57	---	3.8	0.329	---	---	1.60	---	6.9	---	122
7/23/2013	TC9	85	7.8	0.19	---	---	---	2.41	---	5.8	0.297	---	---	3.90	---	8.6	---	153
7/23/2013	TC9	82,52	8.0	0.05	---	---	---	0.59	---	3.3	0.439	---	---	0.35	---	5.0	---	152
7/23/2013	TC9	82	6.6	0.48	---	---	---	4.67	---	8.9	0.332	---	---	4.87	---	9.6	---	181
7/23/2013	TC9	81	5.5	0.13	---	---	---	2.14	---	4.6	0.289	---	---	1.64	---	5.6	---	166
7/23/2014	TC9	105	13.1	0.16	---	---	---	0.82	---	2.7	0.186	---	---	0.16	---	7.1	---	145
7/23/2014	TC9	105	11.5	0.02	---	---	---	0.69	---	2.3	0.188	---	---	0.18	---	5.1	---	140
7/23/2014	TC9	104	9.1	0.09	---	---	---	0.69	---	2.6	0.247	---	---	0.22	---	7.2	---	116
7/23/2014	TC9	94	8.4	0.06	---	---	---	1.16	---	2.4	0.264	---	---	0.33	---	6.7	---	156
7/23/2014	TC9	95	8.3	0.12	---	---	---	0.54	---	2.8	0.215	---	---	0.55	---	6.2	---	135
7/23/2014	TC9	105	11.4	0.04	---	---	---	0.30	---	2.6	0.228	---	---	0.19	---	5.3	---	117
7/14/2015	TC9	77,60	12.4	0.22	---	---	---	3.92	---	3.8	0.285	---	---	3.30	---	7.1	---	188
7/14/2015	TC9	77	5.7	0.33	---	---	---	4.40	---	5.2	0.321	---	---	4.93	---	9.1	---	157
7/14/2015	TC9	84	7.2	0.22	---	---	---	2.54	---	5.3	0.338	---	---	2.84	---	7.9	---	134
7/14/2015	TC9	63,69	81.0	0.48	---	---	---	4.73	---	6.7	0.338	---	---	6.20	---	10.6	---	173
7/14/2015	TC9	82	6.9	0.36	---	---	---	3.76	---	4.6	0.342	---	---	4.80	---	8.5	---	153
7/14/2015	TC9	55,75	7.7	0.25	---	---	---	4.03	---	5.3	0.280	---	---	3.42	---	7.8	---	165
7/14/2015	TC9	90	9.3	0.28	---	---	---	1.81	---	3.4	0.304	---	---	1.69	---	9.2	---	124
7/14/2015	TC9	80	6.8	0.30	---	---	---	3.92	---	5.1	0.312	---	---	4.87	---	9.7	---	159
7/14/2015	TC9	75,75	8.9	0.13	---	---	---	1.69	---	4.2	0.322	---	---	1.86	---	7.2	---	142
7/14/2015	TC9	75,75	12.8	0.51	---	---	---	5.86	---	5.1	0.293	---	---	4.54	---	10.7	---	175

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Appendix A4 Page 10 of 10.–Greens Creek Mine, Greens Creek site 6 (GC6) juvenile Dolly Varden char whole body metals concentrations data.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
7/23/2001	GC6	139	28.4	0.04	---	---	---	1.94	---	16.7	---	---	---	1.24	---	5.0	---	173
7/23/2001	GC6	140	30.5	0.03	---	---	---	0.84	---	4.6	---	---	---	1.00	---	4.5	---	167
7/23/2001	GC6	167	43.9	0.03	---	---	---	0.82	---	5.3	---	---	---	1.94	---	4.3	---	171
7/23/2001	GC6	155	34.8	0.03	---	---	---	1.52	---	5.4	---	---	---	1.78	---	4.5	---	215
7/23/2001	GC6	109	15.7	0.02	---	---	---	0.89	---	11.1	---	---	---	0.33	---	5.3	---	126
7/23/2001	GC6	168	49.1	0.04	---	---	---	0.73	---	8.0	---	---	---	1.96	---	4.6	---	169
7/21/2006	GC6	103	12.6	0.03	---	---	---	0.71	---	8.0	---	---	---	0.70	---	5.2	---	183
7/21/2006	GC6	106	13.5	0.04	---	---	---	0.81	---	12.0	---	---	---	0.62	---	5.6	---	271
7/21/2006	GC6	96	11.8	0.03	---	---	---	0.56	---	12.7	---	---	---	0.97	---	4.5	---	215
7/21/2006	GC6	110	12.0	0.03	---	---	---	0.56	---	7.7	---	---	---	0.92	---	5.9	---	223
7/21/2006	GC6	128	23.2	0.03	---	---	---	0.95	---	5.4	---	---	---	1.31	---	4.4	---	221
7/21/2006	GC6	102	11.5	0.02	---	---	---	0.63	---	6.5	---	---	---	0.86	---	4.5	---	302
7/21/2011	GC6	85-120	---	0.03	---	---	—	0.92	---	6.6	---	---	---	0.82	---	5.7	---	209

Appendix A5 Page 1 of 2.–Kensington Gold Mine, Lower Slate Creek (LSC) and East Fork Slate Creek (EFSC) juvenile Dolly Varden char whole body metals concentrations.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
10/11/2011	LSC	110-130	14.9-23.2	0.05	2430	---	---	0.72	17.3	15.5	0.067	---	6.2	0.50	---	3.8	---	195
8/20/2012	LSC	95	7.7	<0.02	51	---	---	0.45	0.5	3.5	0.167	---	0.3	0.05	---	5.6	---	128
8/20/2012	LSC	115	15.5	0.06	78	---	---	0.64	0.8	9.0	0.107	---	0.3	0.03	---	4.8	---	130
8/20/2012	LSC	110	14.2	0.05	21	---	---	0.54	0.4	6.0	0.162	---	<0.2	0.03	---	4.5	---	171
8/20/2012	LSC	115	17.6	0.05	69	---	---	0.78	0.4	8.9	0.113	---	0.4	0.03	---	5.1	---	170
8/20/2012	LSC	90	9.6	<0.02	18	---	---	0.44	0.3	3.6	0.098	---	<0.2	0.04	---	4.5	---	131
8/20/2012	LSC	105	12.7	0.03	189	---	---	0.92	0.8	5.8	0.127	---	0.4	0.05	---	5.2	---	151
9/9/2013	LSC	125	17.9	0.07	367	---	---	0.47	4.3	5.6	0.234	---	2.2	0.07	---	3.8	---	235
9/9/2013	LSC	110	8.5	0.03	212	---	---	0.39	1.0	3.6	0.263	---	0.6	0.08	---	4.0	---	216
9/9/2013	LSC	120	19.0	0.02	34	---	---	0.36	1.5	3.2	0.169	---	0.7	<0.02	---	3.4	---	215
9/9/2013	LSC	110	15.8	0.34	305	---	---	0.74	2.2	16.7	0.265	---	1.3	0.15	---	3.9	---	262
9/9/2013	LSC	105	11.8	0.03	25	---	---	0.28	1.1	3.4	0.361	---	0.6	0.11	---	4.3	---	221
9/9/2013	LSC	105	9.9	0.05	24	---	---	0.44	0.7	4.3	0.255	---	0.4	0.04	---	3.9	---	215
9/13/2011	EFSC	115-125	13.4-19.5	0.02	46	---	---	1.99	1.3	14.6	0.107	---	1.1	0.04	---	4.6	---	133
8/1/2012	EFSC	166	58.2	0.04	54	---	---	0.57	1.5	75.8	0.130	---	1.0	0.03	---	5.1	---	96
8/1/2012	EFSC	165	44.5	0.04	204	---	---	1.08	2.3	16.9	0.234	---	1.1	0.50	---	5.6	---	123
8/1/2012	EFSC	165	46.4	0.02	20	---	---	0.52	0.7	10.8	0.116	---	0.4	0.12	---	4.9	---	96
8/1/2012	EFSC	175	55.6	0.04	25	---	---	0.67	1.3	31.7	0.215	---	0.8	0.19	---	4.9	---	110
8/1/2012	EFSC	163	56.4	0.02	275	---	---	0.52	3.4	9.7	0.146	---	2.9	0.25	---	4.7	---	122
8/1/2012	EFSC	165	62.7	0.03	42	---	---	0.36	2.2	38.7	0.139	---	1.3	0.34	---	3.8	---	110

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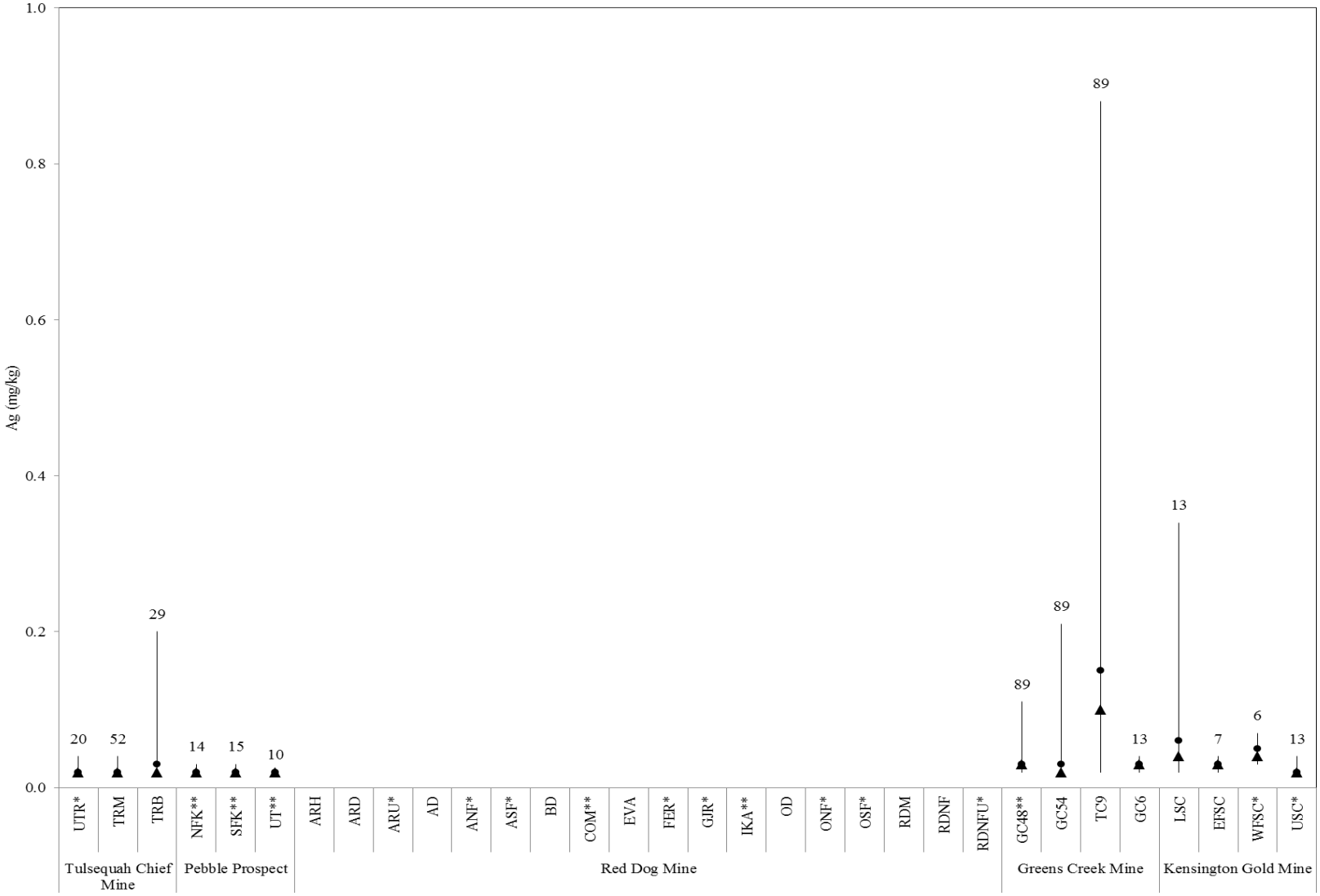
Appendix A5 Page 2 of 2.–Kensington Gold Mine, West Fork Slate Creek (WFSC) and Upper Slate Creek (USC) juvenile Dolly Varden char whole body metals concentrations.

Date Collected	Site	FL (mm)	Weight (g)	Ag (mg/kg)	Al (mg/kg)	As (mg/kg)	Be (mg/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Hg (mg/kg)	Mo (mg/kg)	Ni (mg/kg)	Pb (mg/kg)	Sb (mg/kg)	Se (mg/kg)	Tl (mg/kg)	Zn (mg/kg)
9/10/2013	WFSC	125	24.7	0.05	5200	---	---	0.29	45.9	13.2	0.177	---	24.4	1.55	---	2.5	---	175
9/10/2013	WFSC	120	18.1	0.07	87	---	---	0.17	2.4	5.0	0.158	---	1.1	0.06	---	3.1	---	196
9/10/2013	WFSC	120	19.5	0.04	190	---	---	0.18	2.3	4.1	0.245	---	1.3	0.06	---	3.7	---	182
9/10/2013	WFSC	105	12.4	0.04	5800	---	---	0.20	37.9	11.9	0.137	---	20.7	0.92	---	2.3	---	173
9/10/2013	WFSC	110	11.9	0.04	4270	---	---	0.27	18.5	8.7	0.276	---	11.4	0.65	---	3.2	---	200
9/16/2013	WFSC	90	4.6	0.03	45	---	---	0.16	<0.2	3.1	0.129	---	<0.2	0.03	---	3.3	---	138
8/10/2011	USC	55-125	5.1-21.6	<0.02	1630	---	---	0.14	13.5	11.3	0.112	---	5.5	0.20	---	4.4	---	115
8/2/2012	USC	94	9.1	<0.02	1380	---	---	0.11	4.7	5.2	0.092	---	2.5	0.16	---	4.8	---	103
8/2/2012	USC	96	9.7	0.04	3080	---	---	0.23	9.6	6.7	0.103	---	6.1	0.24	---	3.9	---	113
8/2/2012	USC	105	15.6	<0.02	421	---	---	0.06	2.7	3.1	0.094	---	0.9	0.05	---	4.6	---	106
8/2/2012	USC	97	13.9	<0.02	5	---	---	0.05	0.6	2.1	0.102	---	<0.2	0.02	---	4.9	---	97
8/2/2012	USC	100	10.2	<0.02	11	---	---	0.04	0.3	2.2	0.097	---	0.5	0.03	---	4.1	---	113
8/2/2012	USC	86	6.5	<0.02	9	---	---	0.06	3.2	2.6	0.084	---	1.3	0.05	---	4.9	---	136
8/27/2013	USC	125	18.8	<0.02	178	---	---	0.09	2.6	2.6	0.178	---	1.2	0.03	---	4.1	---	143
8/27/2013	USC	110	14.0	0.03	71	---	---	0.08	1.7	4.3	0.143	---	0.8	<0.02	---	4.6	---	148
8/27/2013	USC	115	14.2	<0.02	212	---	---	0.05	2.6	3.3	0.123	---	1.2	0.03	---	3.8	---	164
8/27/2013	USC	105	13.3	0.02	35	---	---	0.05	2.5	4.5	0.180	---	1.2	<0.02	---	4.3	---	159
8/27/2013	USC	100	8.9	<0.02	151	---	---	0.11	1.5	4.0	0.134	---	0.7	0.02	---	4.9	---	142
8/27/2013	USC	100	8.7	<0.02	76	---	---	0.11	1.3	3.3	0.115	---	0.5	0.02	---	4.2	---	130

Appendix A6 Page 1 of 15.–Statewide juvenile Dolly Varden char whole body Silver (Ag) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.



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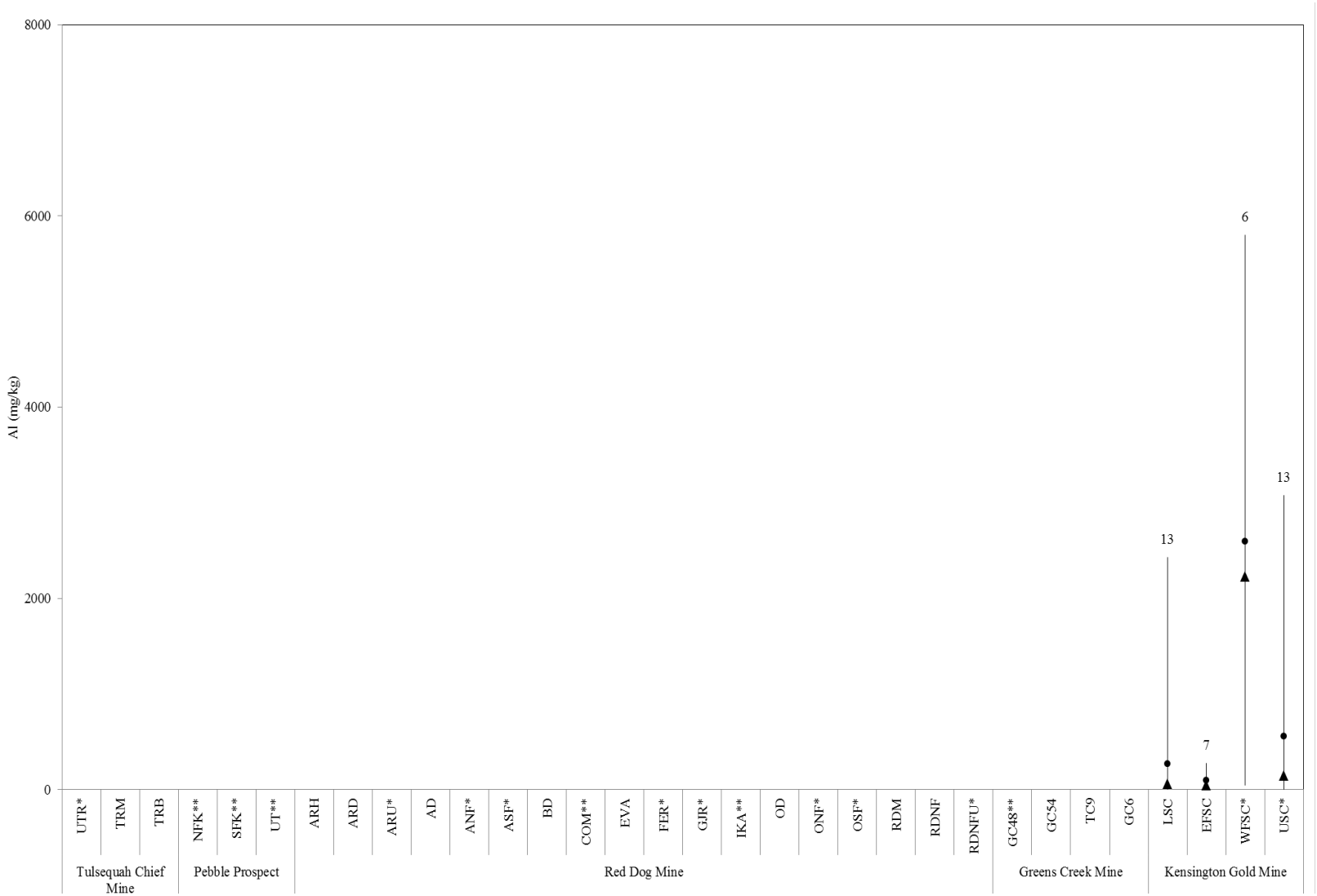
Appendix A6 Page 2 of 15.–Statewide juvenile Dolly Varden char whole body Aluminum (Al) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.



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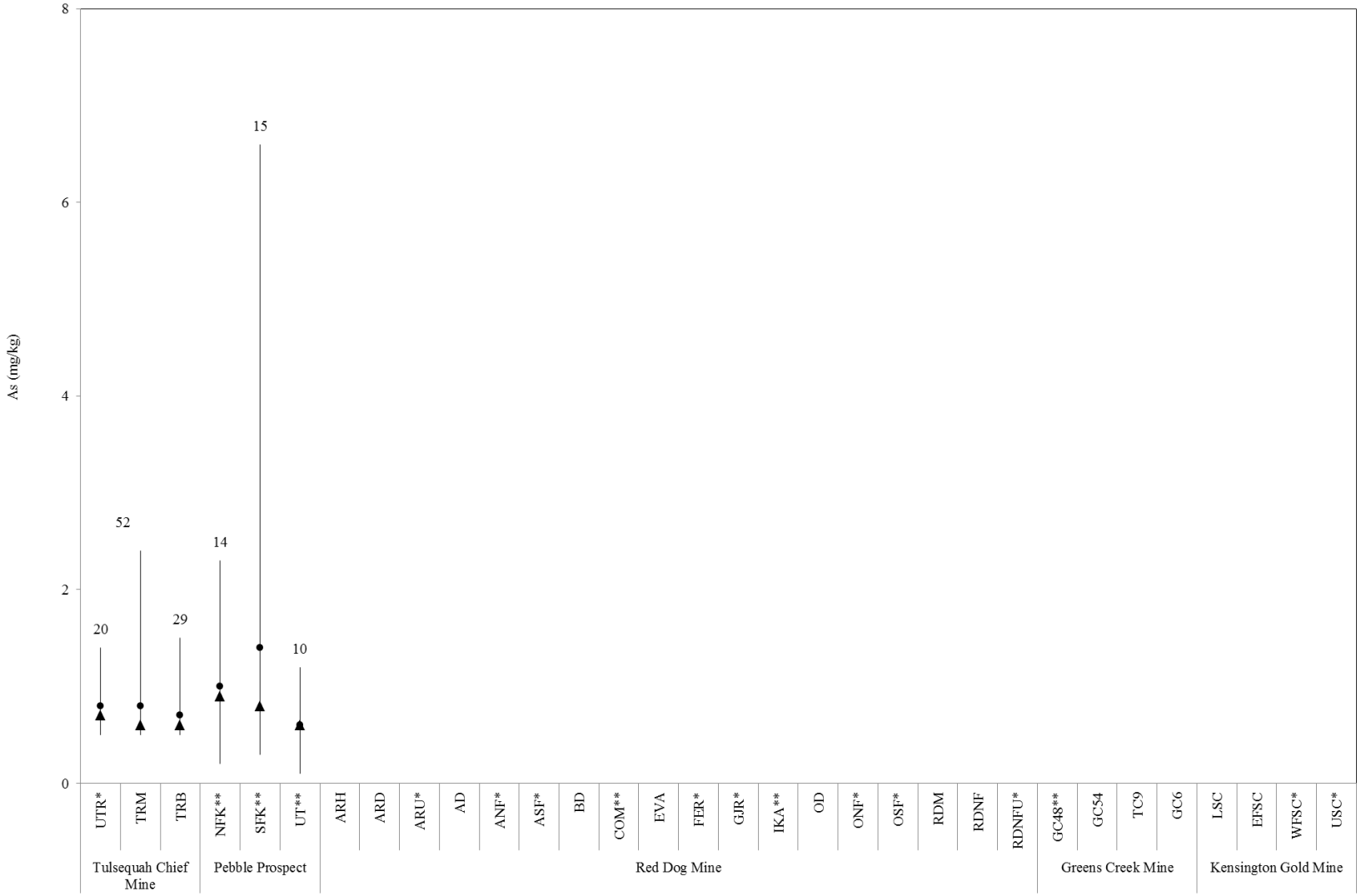
Appendix A6 Page 3 of 15.–Statewide juvenile Dolly Varden char whole body Arsenic (As) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.



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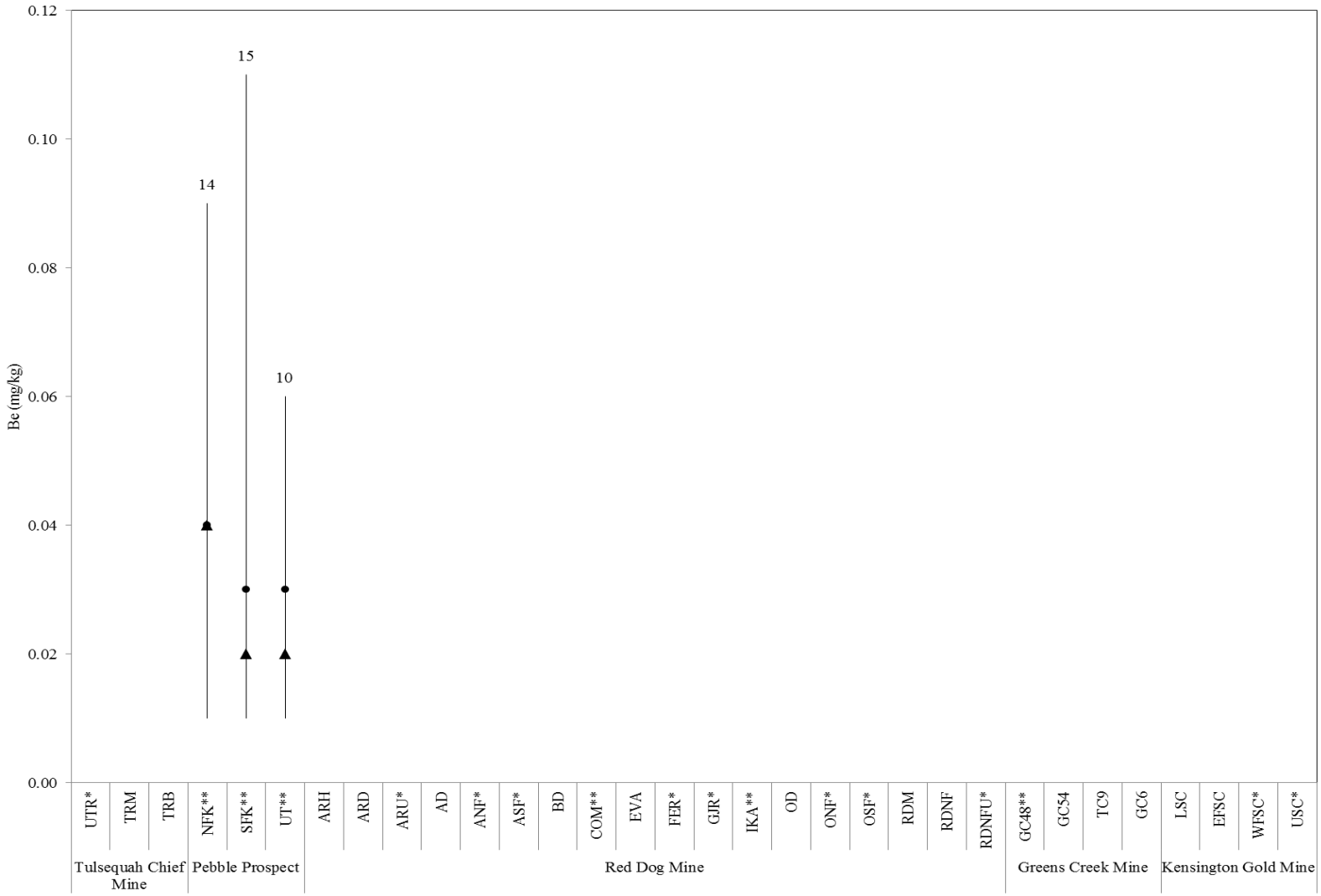
Appendix A6 Page 4 of 15.–Statewide juvenile Dolly Varden char whole body Beryllium (Be) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.



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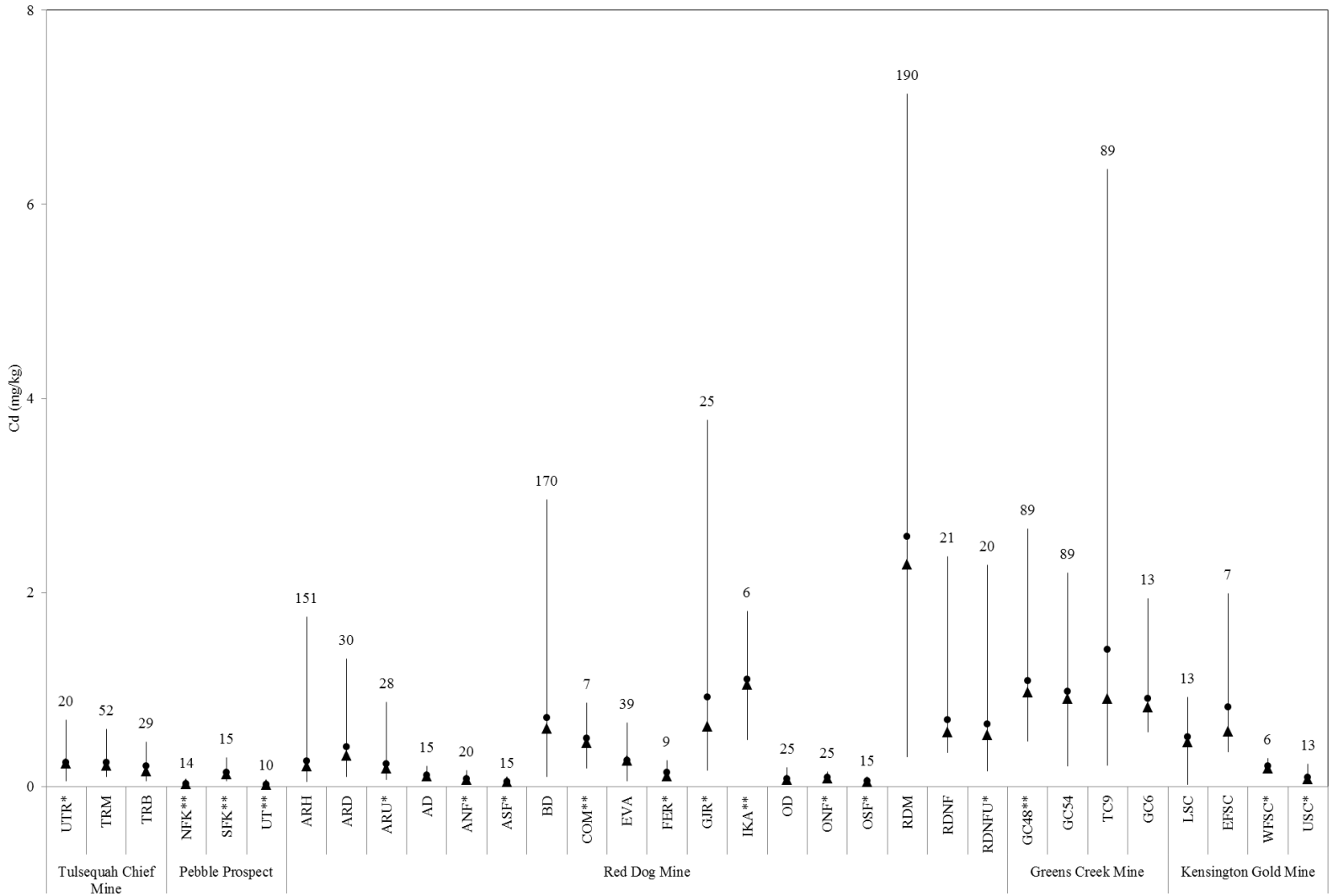
Appendix A6 Page 5 of 15.–Statewide juvenile Dolly Varden char whole body Cadmium (Cd) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.



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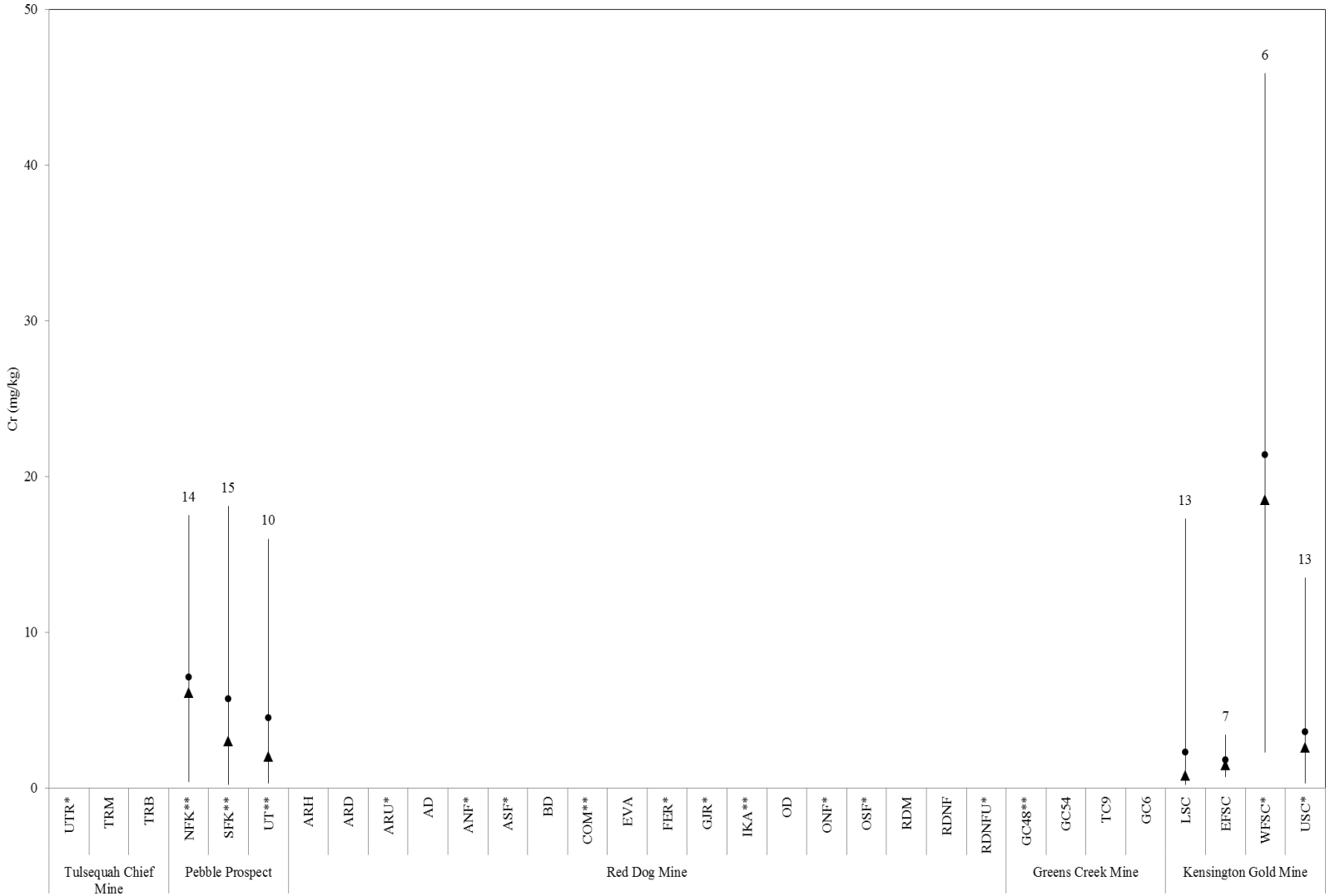
Appendix A6 Page 6 of 15.–Statewide juvenile Dolly Varden char whole body Chromium (Cr) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.



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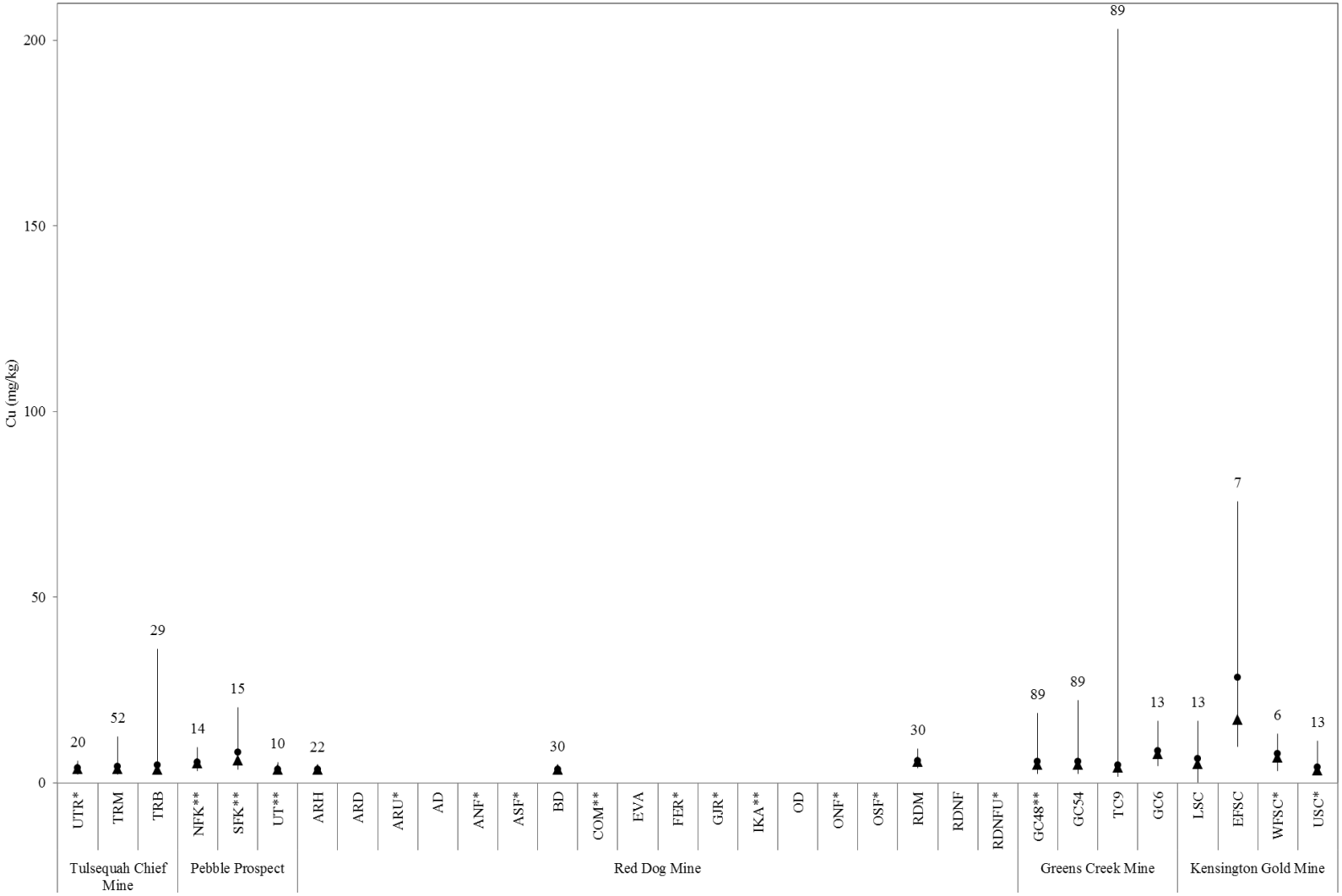
Appendix A6 Page 7 of 15.–Statewide juvenile Dolly Varden char whole body Copper (Cu) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note*: *reference; **exploration.



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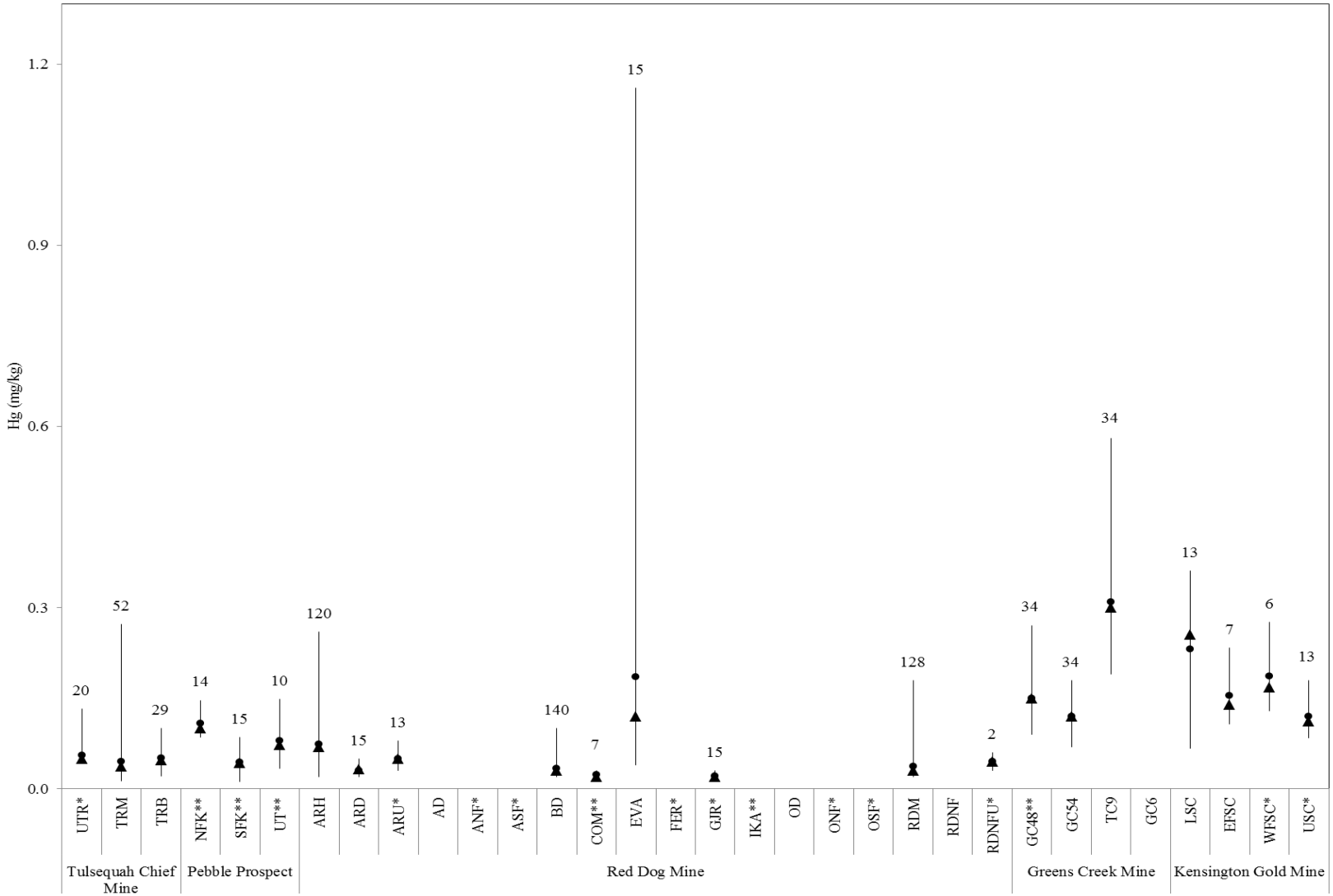
Appendix A6 Page 8 of 15.–Statewide juvenile Dolly Varden char whole body Mercury (Hg) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.



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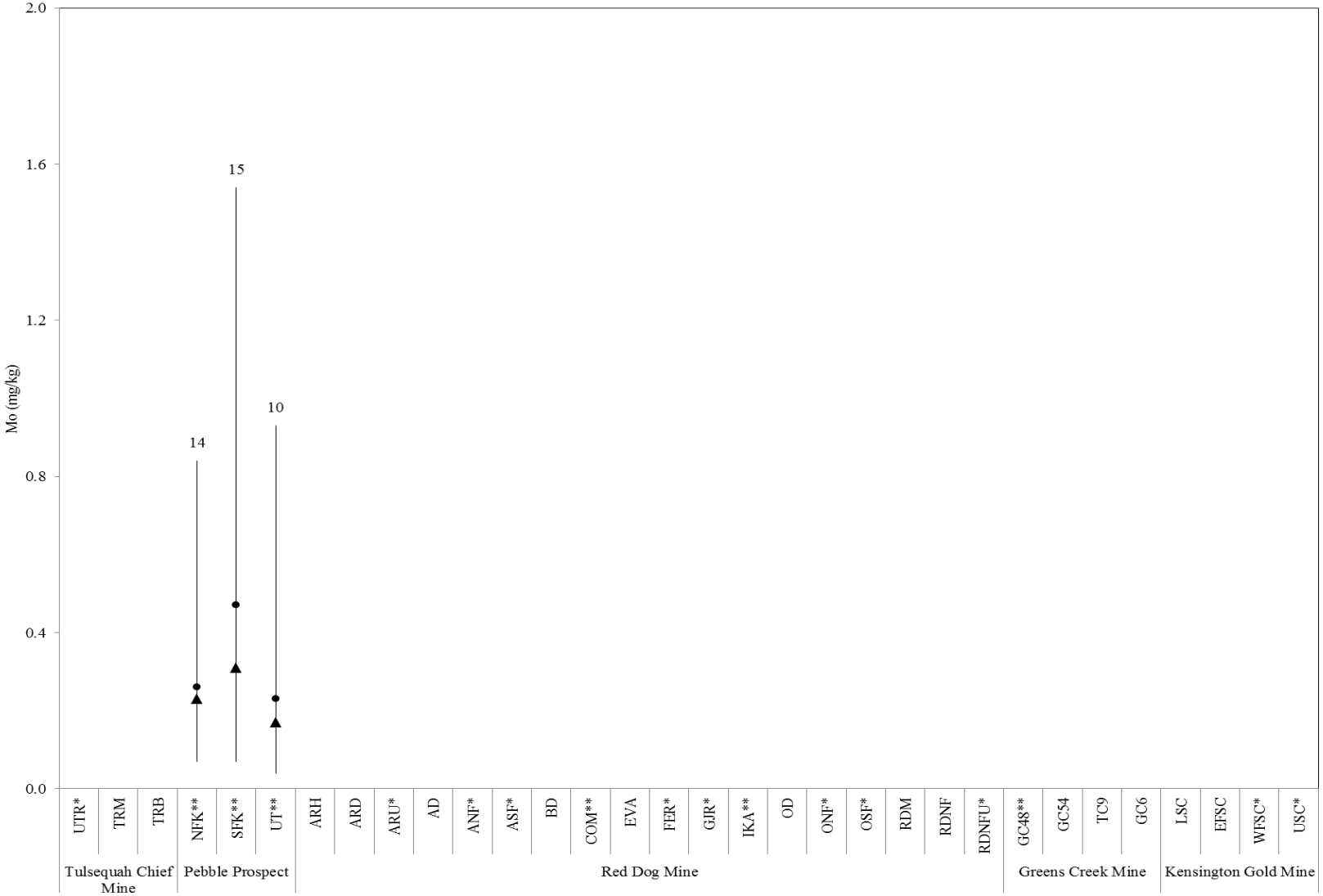
Appendix A6 Page 9 of 15.–Statewide juvenile Dolly Varden char whole body Molybednum (Mo) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.



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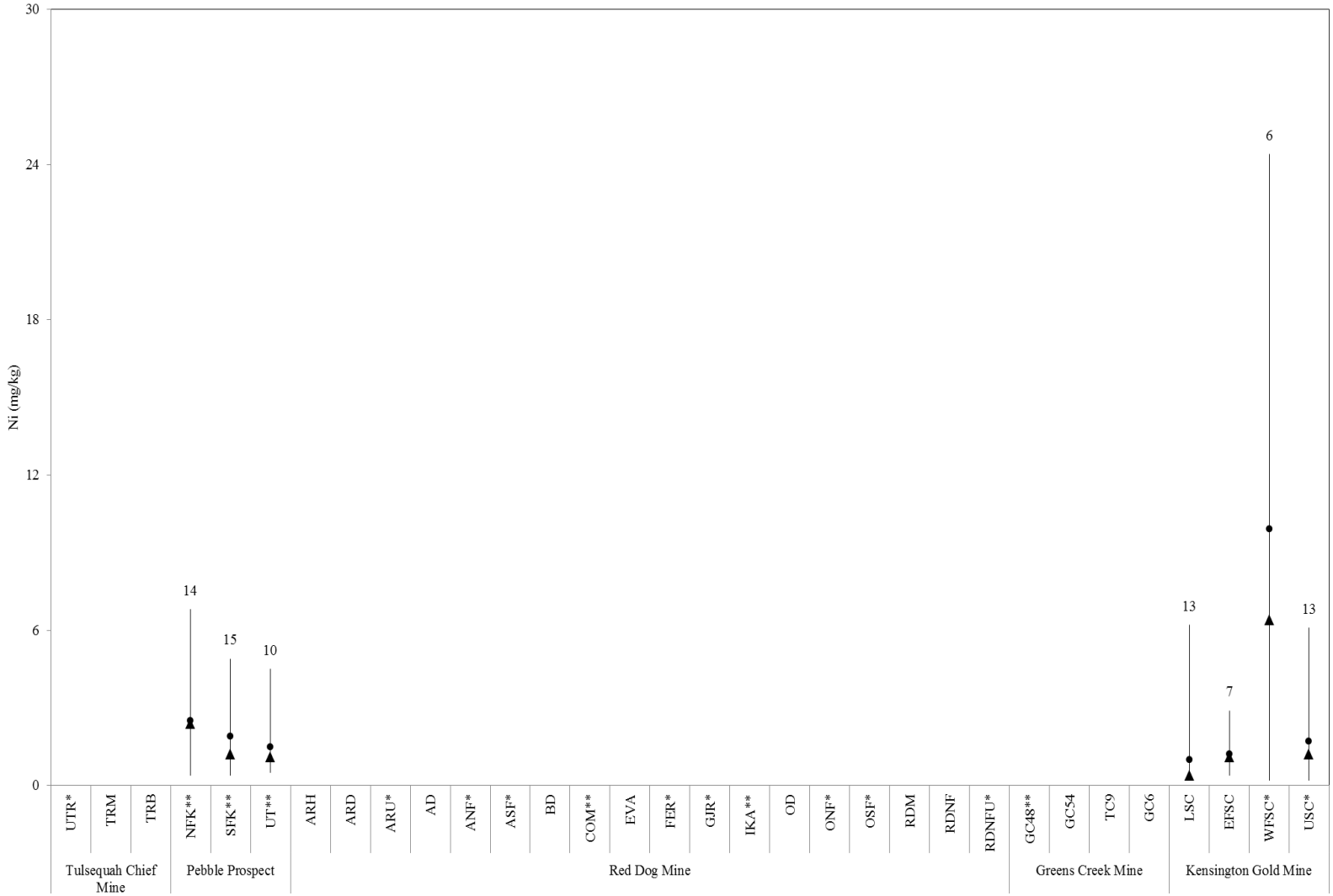
Appendix A6 Page 10 of 15.–Statewide juvenile Dolly Varden char whole body Nickel (Ni) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.



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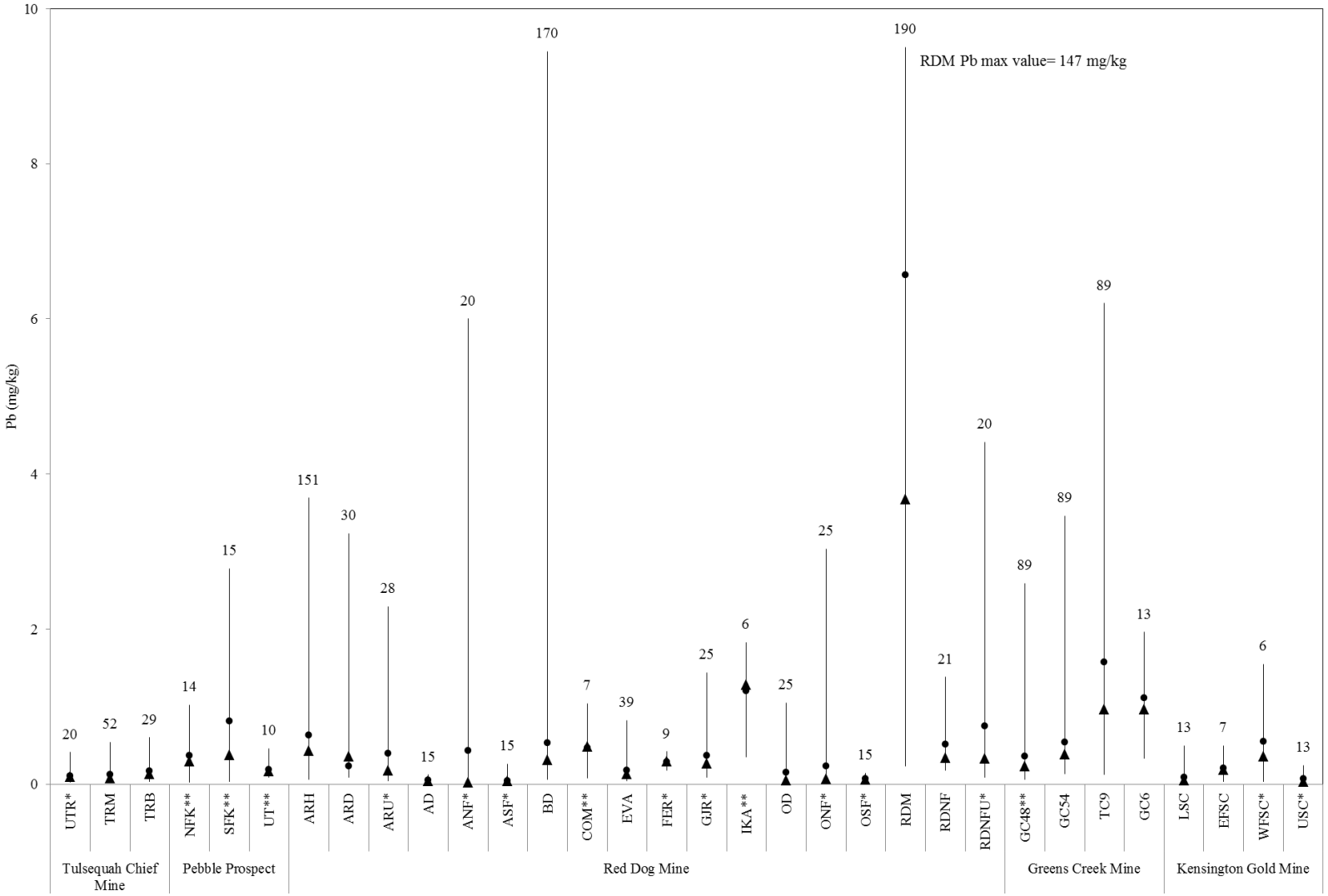
Appendix A6 Page 11 of 15.–Statewide juvenile Dolly Varden char whole body Lead (Pb) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.



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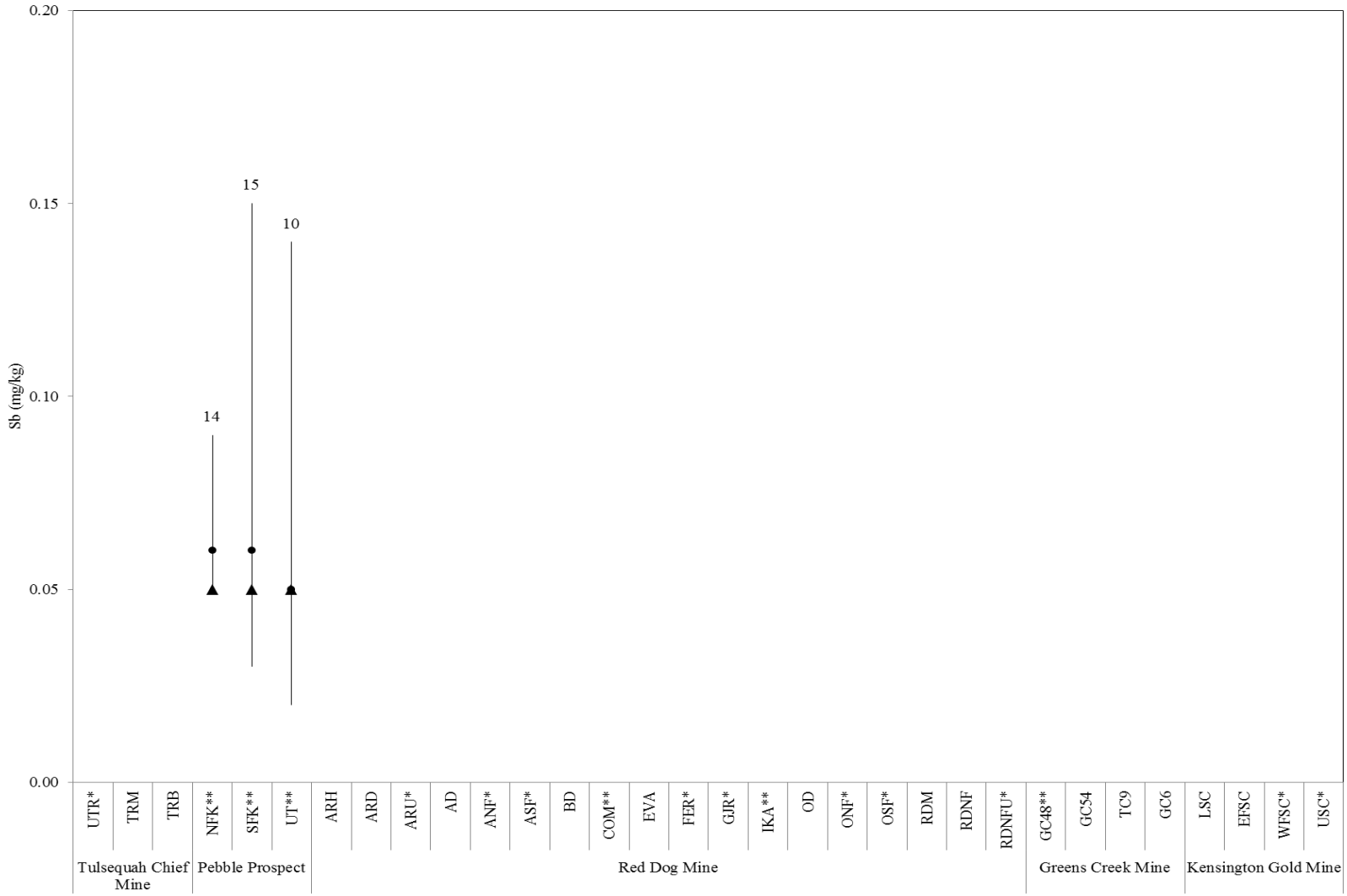
Appendix A6 Page 12 of 15.–Statewide juvenile Dolly Varden char whole body Antimony (Sb) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.



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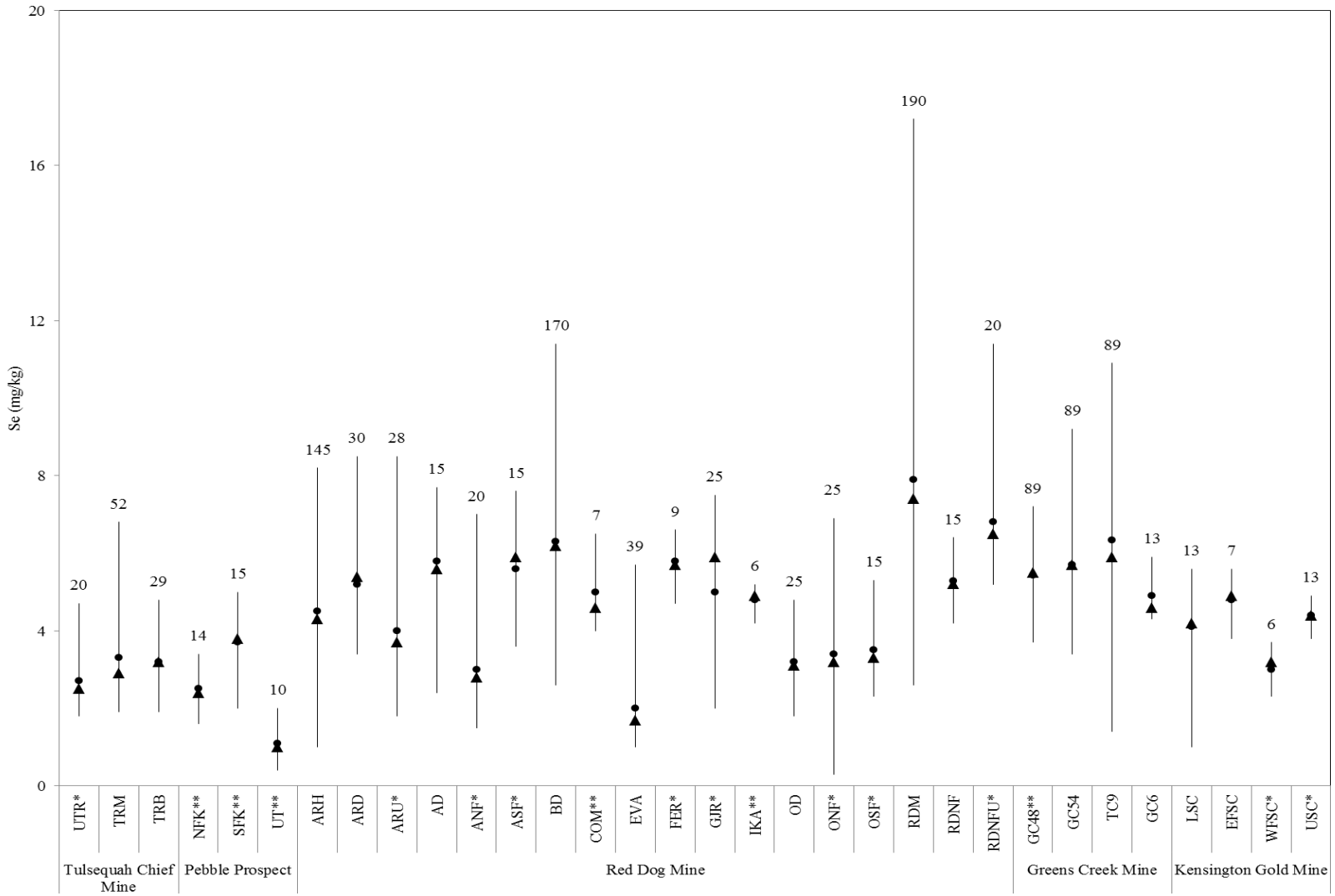
Appendix A6 Page 13 of 15.–Statewide juvenile Dolly Varden char whole body Selenium (Se) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.



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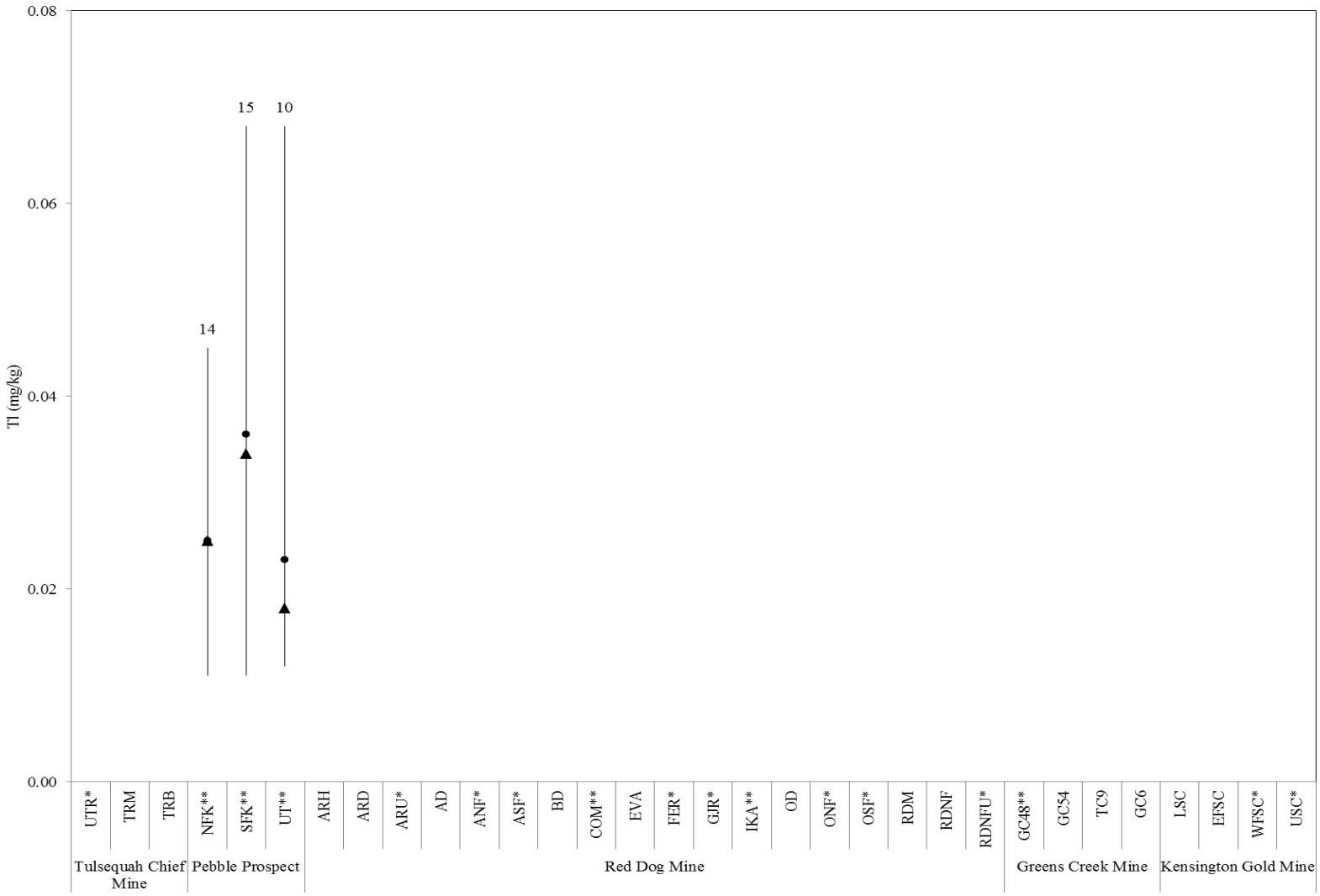
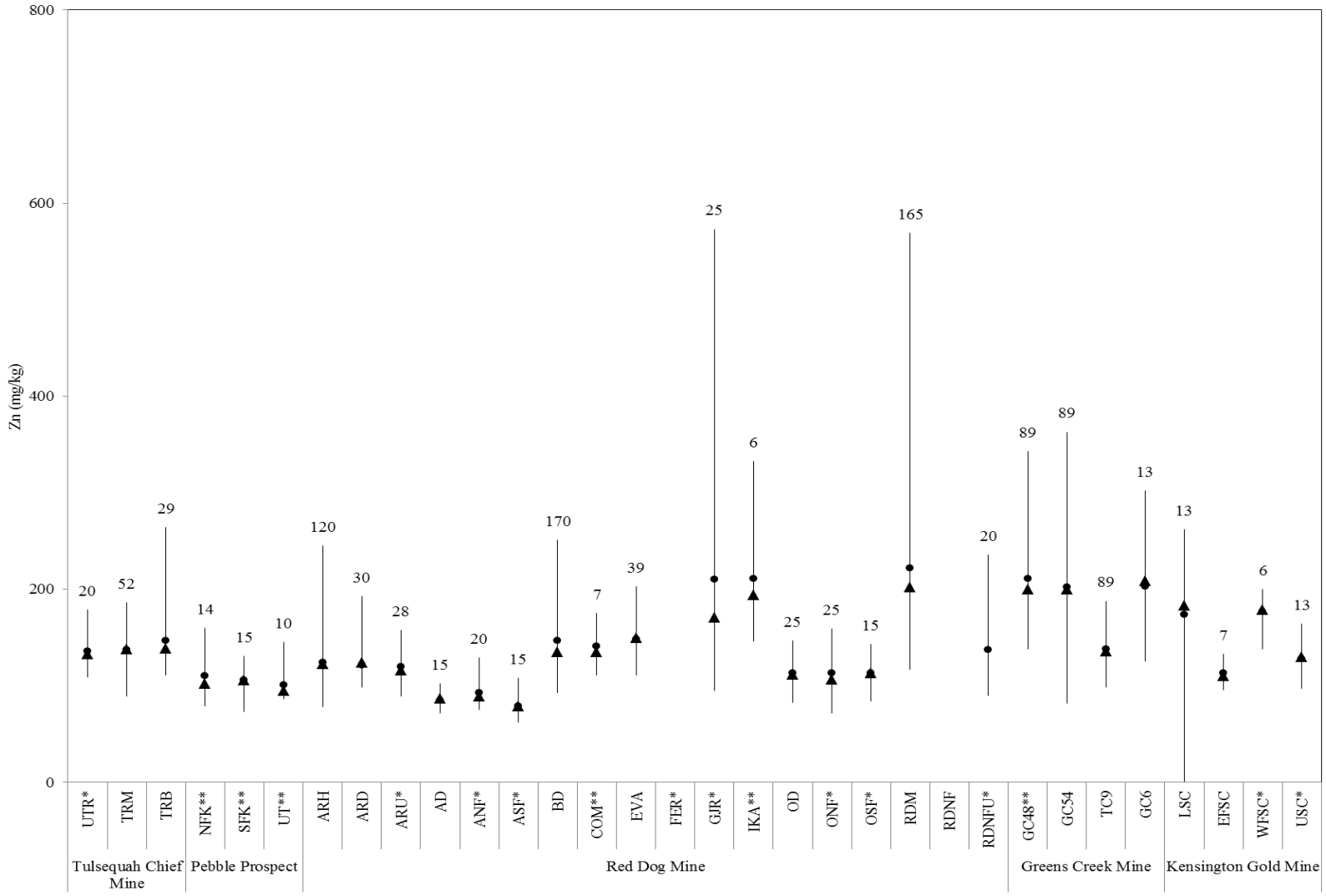
Appendix A6 Page 14 of 15.–Statewide juvenile Dolly Varden char whole body Thallium (Tl) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.

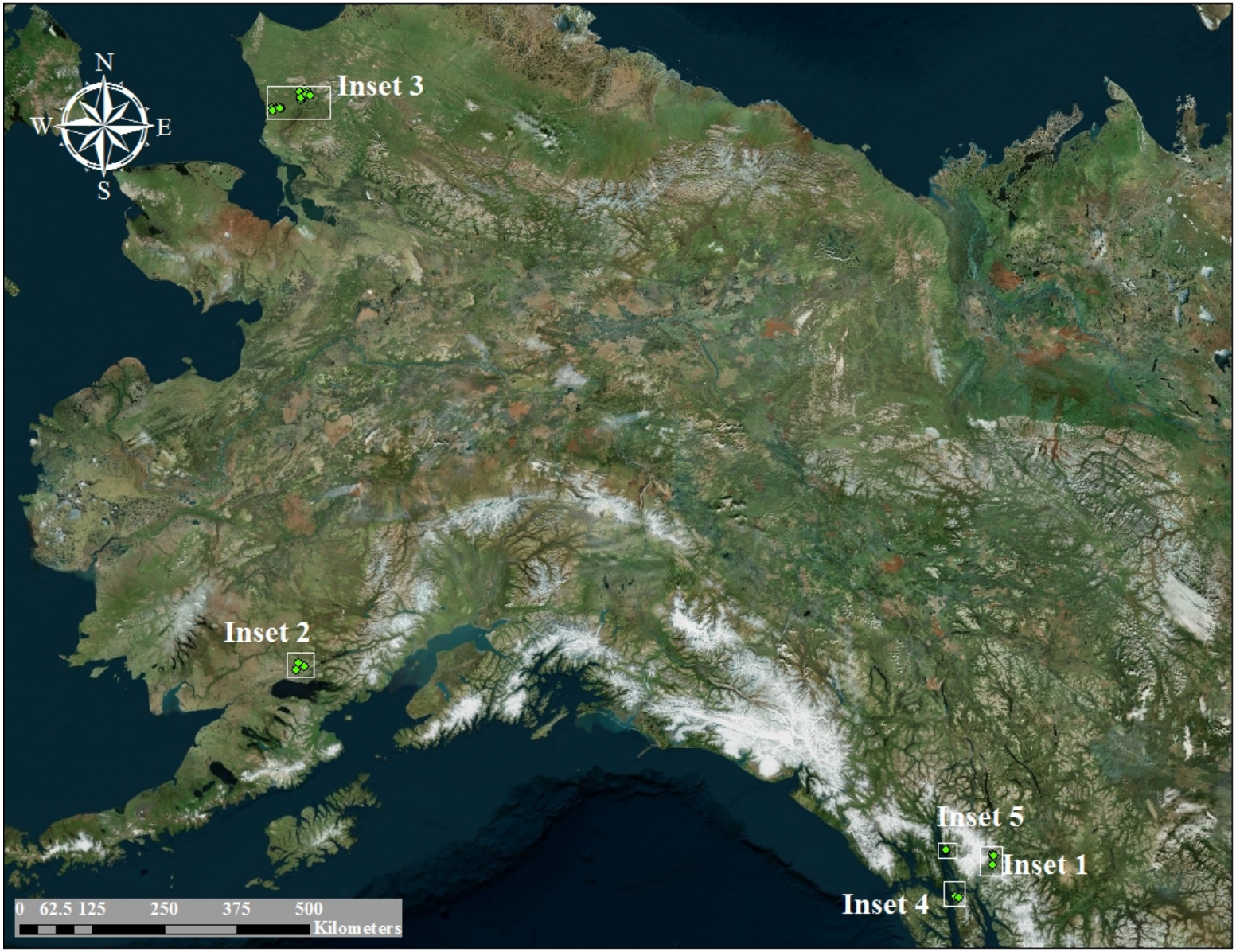


-continued-

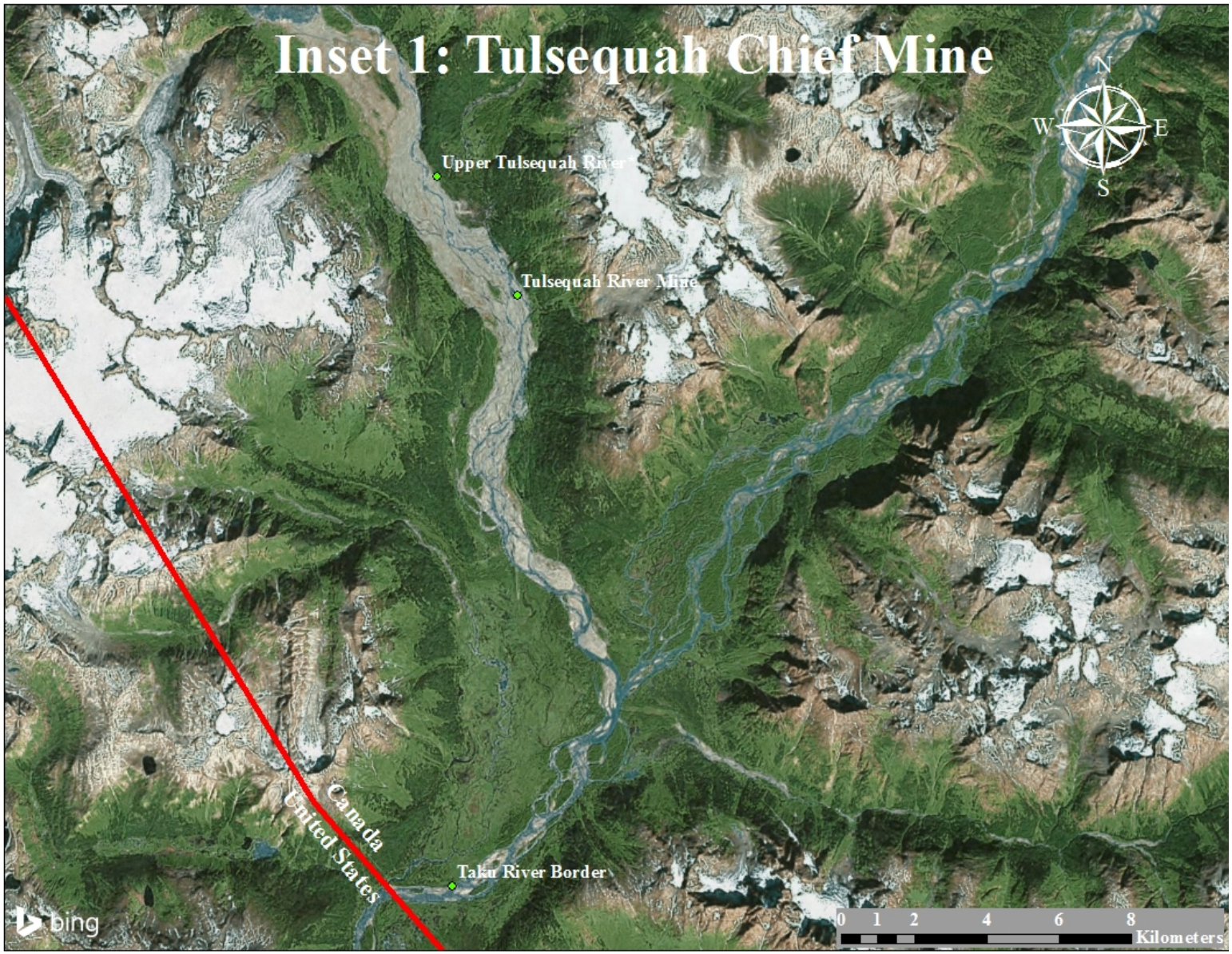
Appendix A6 Page 15 of 15.–Statewide juvenile Dolly Varden char whole body Zinc (Zn) concentrations with mean ●, median ▲, maximum and minimum. Sample size is shown above concentration maximum. *Note:* *reference; **exploration.



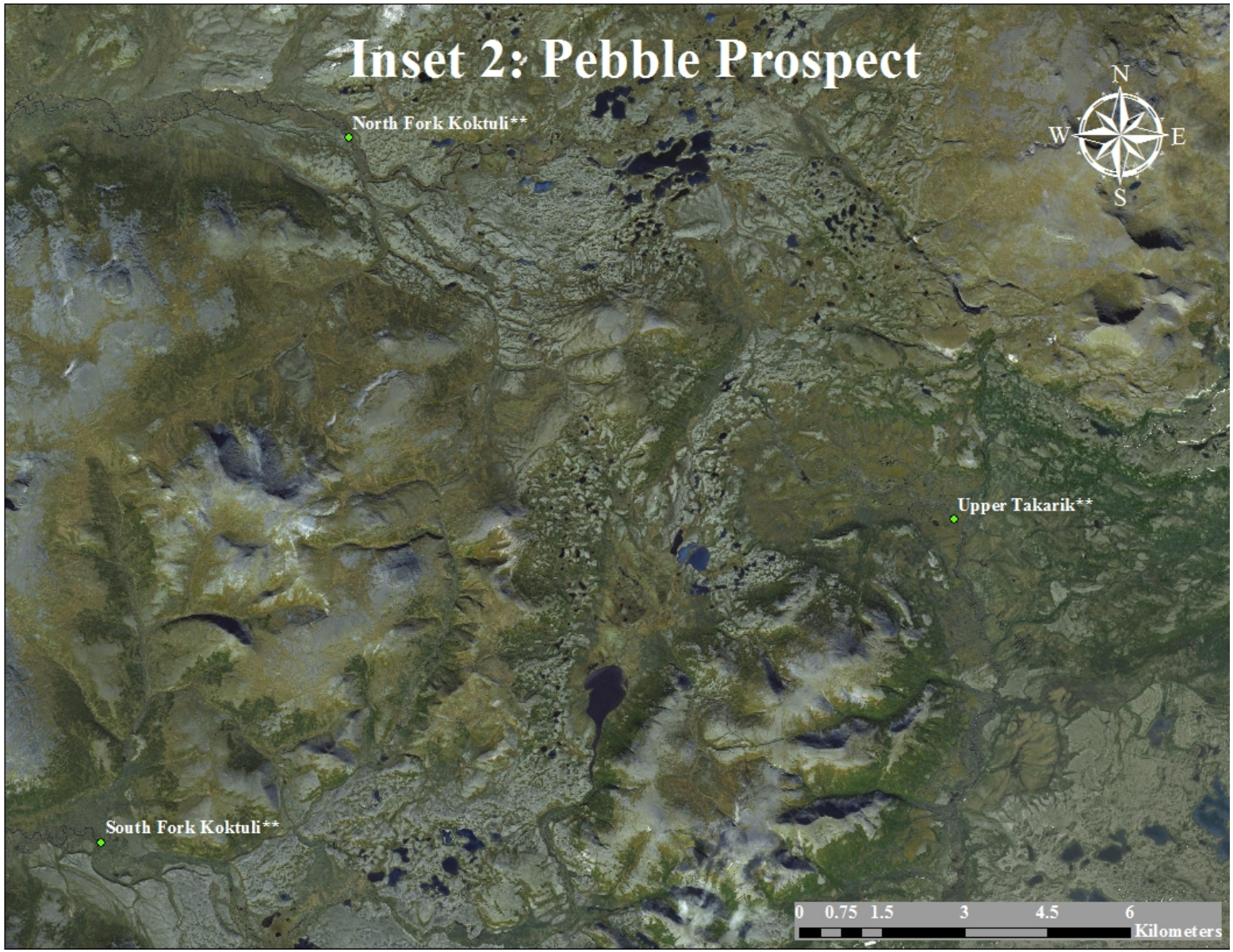
Appendix A7 Page 1 of 6.–Statewide sampling sites.



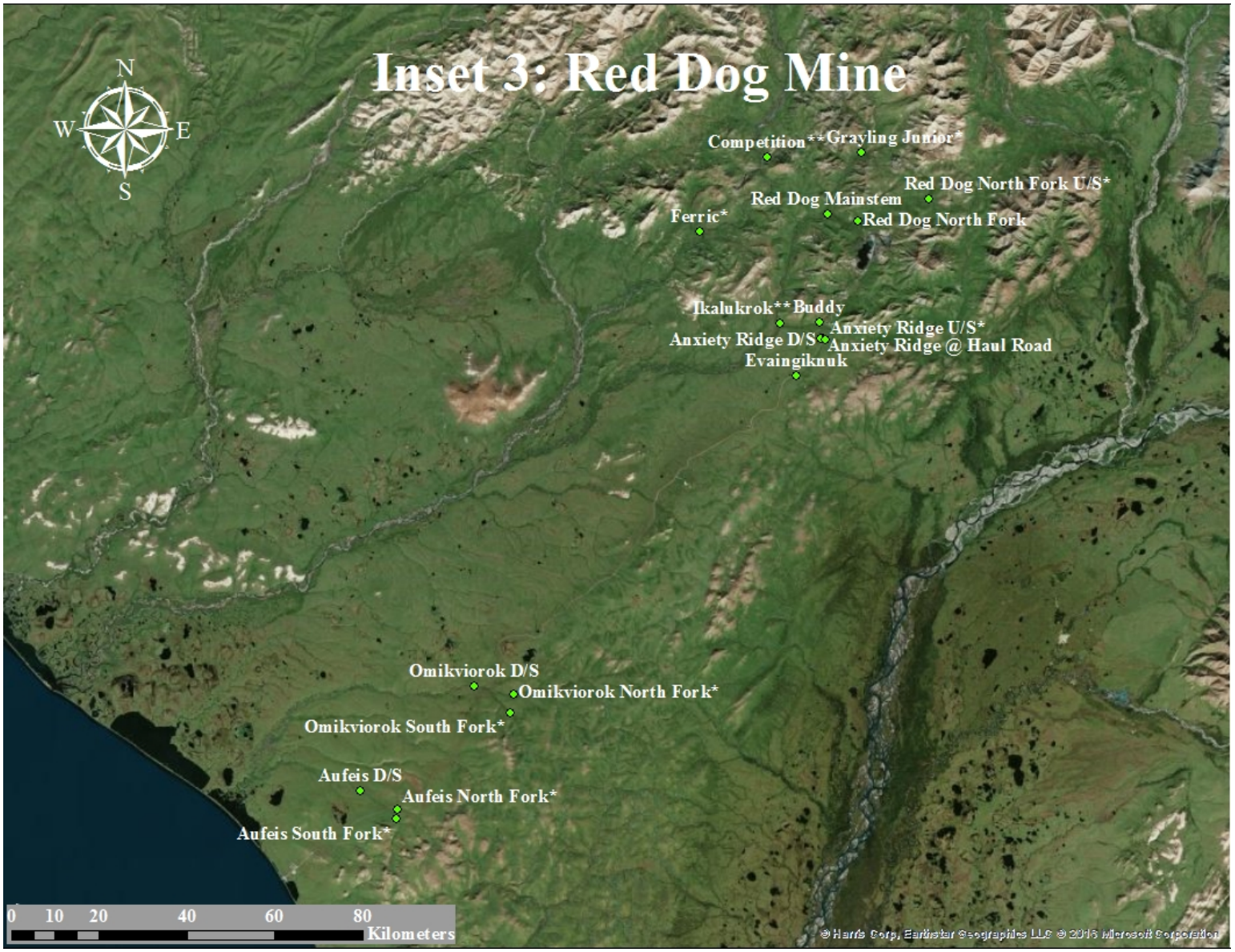
Appendix A7 Page 2 of 6.–Tulsequah Chief Mine sampling sites.



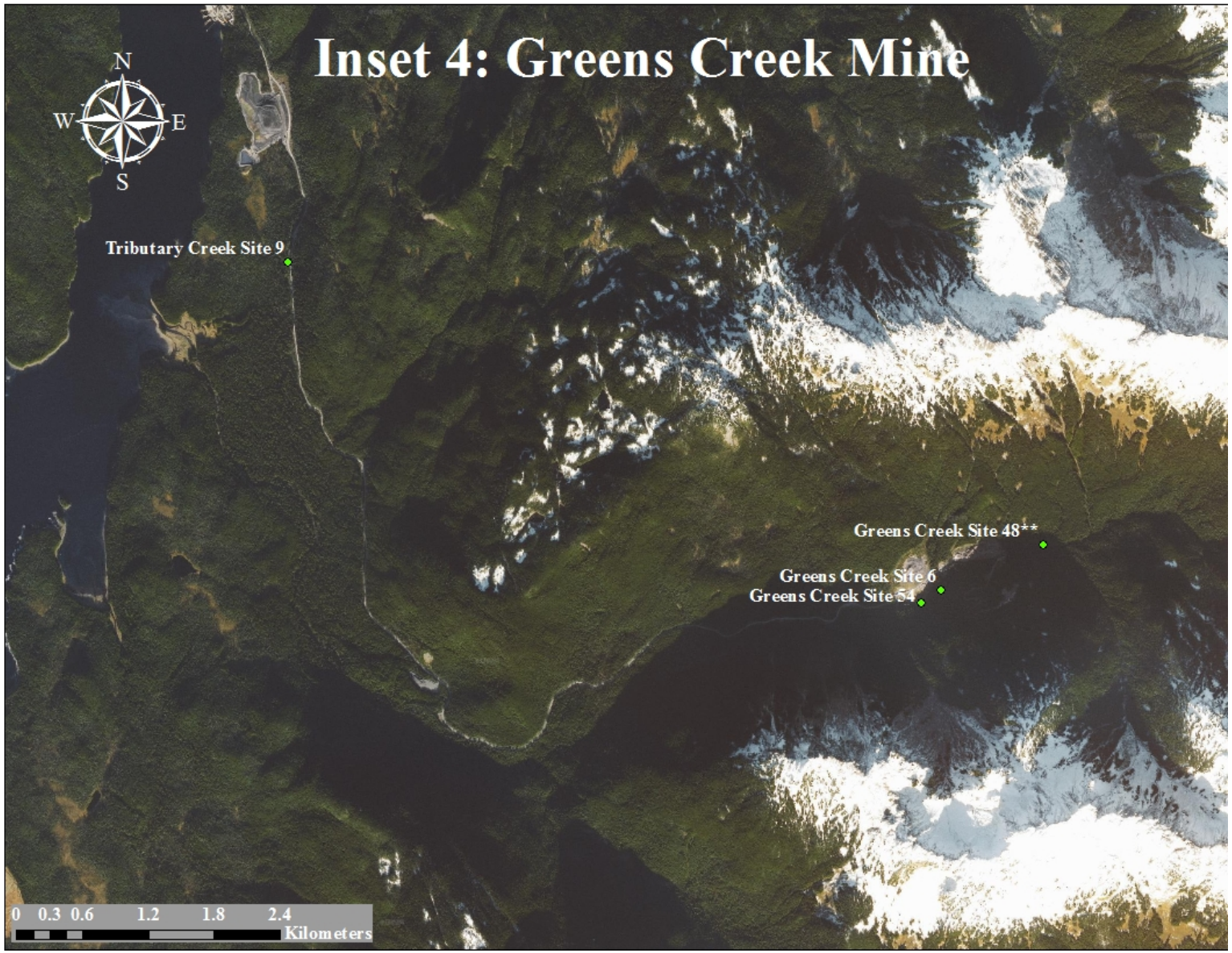
Appendix A7 Page 3 of 6.–Pebble Prospect sampling sites.



Appendix A7 Page 4 of 6.–Red Dog Mine sampling sites.



Appendix A7 Page 5 of 6.–Greens Creek Mine sampling sites.



Appendix A7 Page 6 of 6.–Kensington Gold Mine sampling sites.

APPENDIX B
METALS CONCENTRATIONS LABORATORY REPORTS

Columbia Analytical Services™ 1317 S. 13th Avenue, Kelso, WA 98626 360.577.7222 360.636.1068 (fax) www.caslab.com

July 15, 2011 Analytical Report for Service Request No: K1105585

Joe Hitselberger
Alaska Department of Fish and Game
Division of Habitat
P.O. Box 110024
Juneau, AK 99811

RE: Fish Tissue Metals Analysis

Dear Joe:

Enclosed are the results of the samples submitted to our laboratory on June 21, 2011. For your reference, these analyses have been assigned our service request number K1105585.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.caslab.com. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3281. You may also contact me via Email at MShelton@caslab.com.

Respectfully submitted,

Columbia Analytical Services, Inc.

Mike Shelton

Mike Shelton
Project Chemist

MS/lg

100% Recycled Paper

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition*: Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition*: Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.1 definition*: Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

Columbia Analytical Services, Inc.
Kelso, WA
State Certifications, Accreditations, and Licenses

Agency	Number
Alaska DEC UST	UST-040
Arizona DHS	AZ0339
Arkansas - DEQ	88-0637
California DHS	2286
Florida DOH	E87412
Hawaii DOH	-
Idaho DHW	-
Indiana DOH	C-WA-01
Louisiana DEQ	3016
Louisiana DHH	LA050010
Maine DHS	WA0035
Michigan DEQ	9949
Minnesota DOH	053-999-368
Montana DPHHS	CERT0047
Nevada DEP	WA35
New Jersey DEP	WA005
New Mexico ED	-
North Carolina DWQ	605
Oklahoma DEQ	9801
Oregon - DEQ	WA100010
South Carolina DHEC	61002
Washington DOE	C1203
Wisconsin DNR	998386840
Wyoming (EPA Region 8)	-

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	Alaska Department of Fish and Game	**Service Request No.:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Received:**	6/21/11
Sample Matrix:	Tissue		

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), and Laboratory Control Sample (LCS).

Sample Receipt

Forty one tissue samples were received for analysis at Columbia Analytical Services on 6/21/11. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored frozen at –20°C upon receipt at the laboratory.

Total Metals

Matrix Spike Recovery Exceptions:
The matrix spike recovery of Zinc for sample 061311TRBDVJ5 was outside control criteria. However, the analyte concentration in this sample was significantly higher than the added spike concentration, preventing accurate evaluation of the spike recovery. Recovery in the Laboratory Control Sample (LCS) was acceptable, which indicates the analytical batch was in control. No further corrective action was appropriate.

Relative Percent Difference Exceptions:
The Relative Percent Difference (RPD) for the replicate analysis of Cadmium in sample 061611TRMDVJ6 was outside the project specified control limits. The samples were homogenized, freeze dried, then ground prior to digestion, however this was not sufficient to achieve a completely uniform distribution of Cadmium in the tissue.

No other anomalies associated with the analysis of these samples were observed.

Approved by Mike Shelin **Date** 7/18/11

Columbia Analytical Services™

800.695.7222
www.caslab.com

CHAIN of CUSTODY

Client: Alaska Dept. of Fish and Game

Project: Fish Tissue Metals Analysis

Project Manager: Joe Hitselberger

Telephone No.: (541) 272-3064

Fax No.: (907) 465-4759

Method of Shipment: FedEx

Special Detection Limit/Reporting: See Attached Quote

K1105585

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Matrix: Water	Matrix: Air	Matrix: Other	Prsv.: Yes	Prsv.: No	Sampling Date	Sampling Time	Turn Around Time (working days)
061511UTRDVJ1	1								6/15/11	1000	
061611UTRDVJ12	2								6/16/11	1000	
061611UTRDVJ9	3								6/16/11	1000	
061611UTRDVJ3	4								6/16/11	1000	
061611UTRDVJ6	5								6/16/11	1000	
061611UTRDVJ5	6								6/16/11	1000	
061611UTRDVJ7	7								6/16/11	1000	
061611UTRDVJ2	8								6/16/11	1000	
061611UTRDVJ4	9								6/16/11	1000	
061611UTRDVJ11	10								6/16/11	1000	
061611UTRDVJ10	11								6/16/11	1000	
061611UTRDVJ8	12								6/16/11	1000	
060311TRBDVJ7	13								6/3/11	1000	
061311TRBDVJ2	14								6/13/11	1000	

MARKS

Sample Received Intact: Yes No

Temperature received: Ice No ice

Relinq. by sampler (Sign & Print Name)	Date	Time	Received by (Sign & Print Name)	Date	Time
Joe Hitselberger	6/20/11	0800	Sam SHORKINS	6/21/11	0845
Relinquished by	Date	Time	Received by		
Relinquished by	Date	Time	Received by		
Relinquished by	Date	Time	Received by laboratory	Date	Time

Lab Work No.

Columbia Analytical Services™

800.695.7222
www.caslab.com

CHAIN of CUSTODY

Client: Alaska Dept. of Fish and Game

Project Manager: Joe Hitselberger

Project: Fish Tissue Metals Analysis

Telephone No.: (541) 272-3064

Fax No.: (907) 465-4759

Method of Shipment: FedEx

Special Detection Limit/Reporting: See Attached Quote

K1105385

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Matrix: Water	Matrix: Air	Matrix: Other	Prsv.: Yes	Prsv.: No	Sampling Date	Sampling Time	Turn Around Time (working days)
061611TRMDVJ7	15								6/16/11	1130	
061611TRMDVJ8	16								6/16/11	1130	
061611TRMDVJ9	17								6/16/11	1130	
061611TRMDVJ10	18								6/16/11	1130	
061611TRMDVJ11	19								6/16/11	1130	
061611TRMDVJ12	20								6/16/11	1130	
061611TRMDVJ13	21								6/16/11	1130	
061611TRMDVJ14	22								6/16/11	1130	
061611TRMDVJ15	23								6/16/11	1130	
061611TRMDVJ16	24								6/16/11	1130	
061611TRMDVJ17	25								6/16/11	1130	
061611TRMDVJ18	26								6/16/11	1130	
061611TRMDVJ19	27								6/16/11	1130	
061611TRMDVJ20	28								6/16/11	1130	

MARKS

Sample Received Intact: Yes No

Temperature received: Ice No ice

Relinq. by sampler (Sign & Print Name)	Date	Time	Received by (Sign & Print Name)
Joe Hitselberger	6/20/11	0800	S Hopkins 6/21/11 0845
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory — Date — Time

Lab Work No.

7

Columbia Analytical Services™

800.695.7222
www.caslab.com

CHAIN of CUSTODY

Client: Alaska Dept. of Fish and Game

Project: Fish Tissue Metals Analysis

Project Manager: Joe Hitselberger

Telephone No.: (541) 272-3064

Fax No.: (907) 465-4759

Method of Shipment: FedEx

Special Detection Limit/Reporting: See Attached Quote

K1105585

Sample I.D.	Lab Sample No.	No. of Containers	Matrix: Soil	Matrix: Water	Matrix: Air	Matrix: Other	Prsv.: Yes	Prsv.: No	Sampling Date	Sampling Time	Turn Around Time (working days)
061411TRBDVJ1	29								6/15/11	1000	
060311TRBDVJ9	30								6/3/11	1000	
061311TRBDVJ5	31								6/13/11	1000	
061311TRBDVJ6	32								6/13/11	1000	
061311TRBDVJ3	33								6/13/11	1000	
061311TRBDVJ4	34								6/13/11	1000	
060311TRBDVJ8	35								6/3/11	1000	
061611TRMDVJ1	36								6/16/11	1130	
061611TRMDVJ2	37								6/16/11	1130	
061611TRMDVJ3	38								6/16/11	1130	
061611TRMDVJ4	39								6/16/11	1130	
061611TRMDVJ5	40								6/16/11	1130	
061611TRMDVJ6	41								6/16/11	1130	

MARKS

Sample Received Intact: Yes No

Temperature received: Ice No ice

Relinq. by sampler (Sign & Print Name)	Date	Time	Received by (Sign & Print Name)
Joe Hitselberger	6/20/11	0800	SHOPKINS 6/21/11 0845
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by
Relinquished by	Date	Time	Received by laboratory — Date — Time

Lab Work No.

Columbia Analytical Services, Inc.
Cooler Receipt and Preservation Form

PC Mike

Client / Project: Alaska Dept. of Fish + Game Service Request *K11* 5585

Received: 10/21/11 Opened: 10/21/11 By: SN Unloaded: 10/21/11 By: SN

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? _____

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Cooler Temp °C	Temp Blank °C	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
3.1	—	300		8757 1197 8101	

7. Packing material used. *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Sleeves* *Other* _____
8. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
9. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
10. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
11. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
12. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
13. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
14. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
15. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Page 1 *of* _____

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	06/15/11
Sample Matrix:	Tissue	**Date Received:**	06/21/11

Solids, Total

Prep Method:	NONE	Units:	PERCENT
Analysis Method:	Freeze Dry	Basis:	Wet
Test Notes:			

Sample Name	Lab Code	Date Analyzed	Result	Result Notes
061511UTRDVJ1	K1105585-001	06/24/11	20.9	
061611UTRDVJ12	K1105585-002	06/24/11	20.8	
061611UTRDVJ9	K1105585-003	06/24/11	19.2	
061611UTRDVJ3	K1105585-004	06/24/11	20.2	
061611UTRDVJ6	K1105585-005	06/24/11	20.9	
061611UTRDVJ5	K1105585-006	06/24/11	21.5	
061611UTRDVJ7	K1105585-007	06/24/11	20.5	
061611UTRDVJ2	K1105585-008	06/24/11	22.5	
061611UTRDVJ4	K1105585-009	06/24/11	22.2	
061611UTRDVJ11	K1105585-010	06/24/11	20.0	
061611UTRDVJ10	K1105585-011	06/24/11	20.1	
061611UTRDVJ8	K1105585-012	06/24/11	22.1	
060311TRBDVJ7	K1105585-013	06/24/11	23.7	
061311TRBDVJ2	K1105585-014	06/24/11	23.0	
061611TRMDVJ7	K1105585-015	06/24/11	22.9	
061611TRMDVJ8	K1105585-016	06/24/11	21.6	
061611TRMDVJ9	K1105585-017	06/24/11	21.7	
061611TRMDVJ10	K1105585-018	07/13/11	23.3	
061611TRMDVJ11	K1105585-019	06/24/11	22.4	
061611TRMDVJ12	K1105585-020	06/24/11	20.2	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	06/16/11
Sample Matrix:	Tissue	**Date Received:**	06/21/11

Solids, Total

Prep Method:	NONE	Units:	PERCENT
Analysis Method:	Freeze Dry	Basis:	Wet
Test Notes:			

Sample Name	Lab Code	Date Analyzed	Result	Result Notes
061611TRMDVJ13	K1105585-021	06/24/11	22.4	
061611TRMDVJ14	K1105585-022	06/24/11	22.3	
061611TRMDVJ15	K1105585-023	06/24/11	19.9	
061611TRMDVJ16	K1105585-024	06/24/11	21.9	
061611TRMDVJ17	K1105585-025	06/24/11	23.1	
061611TRMDVJ18	K1105585-026	06/24/11	19.0	
061611TRMDVJ19	K1105585-027	06/24/11	23.9	
061611TRMDVJ20	K1105585-028	06/24/11	21.4	
061411TRBDVJ1	K1105585-029	06/24/11	21.4	
060311TRBDVJ9	K1105585-030	06/24/11	24.1	
061311TRBDVJ5	K1105585-031	06/24/11	23.4	
061311TRBDVJ6	K1105585-032	06/24/11	25.3	
061311TRBDVJ3	K1105585-033	06/24/11	25.5	
061311TRBDVJ4	K1105585-034	06/24/11	23.5	
060311TRBDVJ8	K1105585-035	06/24/11	25.2	
061611TRMDVJ1	K1105585-036	06/24/11	24.3	
061611TRMDVJ2	K1105585-037	06/24/11	25.1	
061611TRMDVJ3	K1105585-038	06/24/11	23.3	
061611TRMDVJ4	K1105585-039	06/24/11	23.9	
061611TRMDVJ5	K1105585-040	06/24/11	22.6	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	06/16/11
Sample Matrix:	Tissue	**Date Received:**	06/21/11

Solids, Total

Prep Method:	NONE	Units:	PERCENT
Analysis Method:	Freeze Dry	Basis:	Wet
Test Notes:			

Sample Name	Lab Code	Date Analyzed	Result	Result Notes
061611TRMDVJ6	K1105585-041	06/24/11	22.1	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	06/16/11
Sample Matrix:	Tissue	**Date Received:**	06/21/11
		Date Extracted:	NA
		Date Analyzed:	06/24/11

Duplicate Summary

Sample Name:	061611UTRDVJ8	Units:	PERCENT
Lab Code:	K1105585-012D	Basis:	Wet
Test Notes:			

Analyte	Prep Method	Analysis Method	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Solids, Total	NA	Freeze Dry	22.1	22.2	22.2	<1	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	06/13/11
Sample Matrix:	Tissue	**Date Received:**	06/21/11
		Date Extracted:	NA
		Date Analyzed:	06/24/11

Duplicate Summary

Sample Name:	061311TRBDVJ5	Units:	PERCENT
Lab Code:	K1105585-031D	Basis:	Wet
Test Notes:			

Analyte	Prep Method	Analysis Method	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Solids, Total	NA	Freeze Dry	23.4	24.0	23.7	3	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	06/16/11
Sample Matrix:	Tissue	**Date Received:**	06/21/11
		Date Extracted:	NA
		Date Analyzed:	06/24/11

Duplicate Summary

Sample Name:	061611TRMDVJ6	Units:	PERCENT
Lab Code:	K1105585-041D	Basis:	Wet
Test Notes:			

Analyte	Prep Method	Analysis Method	Sample Result	Duplicate Sample Result	Average	Relative Percent Difference	Result Notes
Solids, Total	NA	Freeze Dry	22.1	22.2	22.2	<1	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	06/03-16/11
Sample Matrix:	Tissue	**Date Received:**	06/21/11

Mercury, Total

Prep Method:	METHOD	Units:	ng/g
Analysis Method:	1631E	Basis:	Dry
Test Notes:			

Sample Name	Lab Code	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
061511UTRDVJ1	K1105585-001	1.0	20	06/29/11	06/30/11	85.8	
061611UTRDVJ12	K1105585-002	1.0	20	06/29/11	06/30/11	32.5	
061611UTRDVJ9	K1105585-003	1.0	20	06/29/11	06/30/11	64.1	
061611UTRDVJ3	K1105585-004	1.0	20	06/29/11	06/30/11	30.4	
061611UTRDVJ6	K1105585-005	1.0	20	06/29/11	06/30/11	33.8	
061611UTRDVJ5	K1105585-006	1.0	20	06/29/11	06/30/11	47.8	
061611UTRDVJ7	K1105585-007	1.0	20	06/29/11	06/30/11	88.0	
061611UTRDVJ2	K1105585-008	1.0	20	06/29/11	06/30/11	40.7	
061611UTRDVJ4	K1105585-009	1.0	20	06/29/11	06/30/11	21.1	
061611UTRDVJ11	K1105585-010	1.0	20	06/29/11	06/30/11	47.2	
061611UTRDVJ10	K1105585-011	1.0	20	06/29/11	06/30/11	57.6	
061611UTRDVJ8	K1105585-012	2.0	40	06/29/11	06/30/11	67.2	
060311TRBDVJ7	K1105585-013	1.0	20	06/29/11	06/30/11	42.3	
061311TRBDVJ2	K1105585-014	1.0	20	06/29/11	06/30/11	65.0	
061611TRMDVJ7	K1105585-015	1.0	20	06/29/11	06/30/11	30.2	
061611TRMDVJ8	K1105585-016	1.0	20	06/29/11	06/30/11	44.8	
061611TRMDVJ9	K1105585-017	1.0	20	06/29/11	06/30/11	28.7	
061611TRMDVJ10	K1105585-018	1.0	20	06/29/11	06/30/11	38.2	
061611TRMDVJ11	K1105585-019	1.0	20	06/29/11	06/30/11	34.7	
061611TRMDVJ12	K1105585-020	1.0	20	06/29/11	06/30/11	60.3	
Method Blank1	K1105585-MB1	1.0	20	06/29/11	06/30/11	ND	
Method Blank2	K1105585-MB2	1.0	20	06/29/11	06/30/11	ND	
Method Blank3	K1105585-MB3	1.0	20	06/29/11	06/30/11	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	06/03-16/2011
Sample Matrix:	Tissue	**Date Received:**	06/21/11

Mercury, Total

Prep Method:	METHOD	Units:	ng/g
Analysis Method:	1631E	Basis:	Dry
Test Notes:			

Sample Name	Lab Code	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
061611TRMDVJ13	K1105585-021	2.0	40	06/29/11	06/30/11	59.8	
061611TRMDVJ14	K1105585-022	1.0	20	06/29/11	06/30/11	32.4	
061611TRMDVJ15	K1105585-023	1.0	20	06/29/11	06/30/11	47.6	
061611TRMDVJ16	K1105585-024	1.0	20	06/29/11	06/30/11	45.5	
061611TRMDVJ17	K1105585-025	1.0	20	06/29/11	06/30/11	22.0	
061611TRMDVJ18	K1105585-026	1.0	20	06/29/11	06/30/11	273	
061611TRMDVJ19	K1105585-027	1.0	20	06/29/11	06/30/11	43.2	
061611TRMDVJ20	K1105585-028	1.0	20	06/29/11	06/30/11	56.5	
061411TRBDVJ1	K1105585-029	1.0	20	06/29/11	06/30/11	69.0	
060311TRBDVJ9	K1105585-030	1.0	20	06/29/11	06/30/11	55.7	
061311TRBDVJ5	K1105585-031	1.0	20	06/29/11	06/30/11	36.5	
061311TRBDVJ6	K1105585-032	1.0	20	06/29/11	06/30/11	47.9	
061311TRBDVJ3	K1105585-033	1.0	20	06/29/11	06/30/11	58.1	
061311TRBDVJ4	K1105585-034	1.0	20	06/29/11	06/30/11	27.1	
060311TRBDVJ8	K1105585-035	1.0	20	06/29/11	06/30/11	35.8	
061611TRMDVJ1	K1105585-036	1.0	20	06/29/11	06/30/11	41.4	
061611TRMDVJ2	K1105585-037	1.0	20	06/29/11	06/30/11	69.0	
061611TRMDVJ3	K1105585-038	1.0	20	06/29/11	06/30/11	39.3	
061611TRMDVJ4	K1105585-039	1.0	20	06/29/11	06/30/11	27.6	
061611TRMDVJ5	K1105585-040	2.0	40	06/29/11	06/30/11	62.8	
Method Blank1	K1105585-MB1	1.0	20	06/29/11	06/30/11	ND	
Method Blank2	K1105585-MB2	1.0	20	06/29/11	06/30/11	ND	
Method Blank3	K1105585-MB3	1.0	20	06/29/11	06/30/11	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	06/16/11
Sample Matrix:	Tissue	**Date Received:**	06/21/11

Mercury, Total

Prep Method:	METHOD	Units:	ng/g
Analysis Method:	1631E	Basis:	Dry
Test Notes:			

Sample Name	Lab Code	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
061611TRMDVJ6	K1105585-041	2.0	40	06/27/11	06/28/11	63.6	
Method Blank1	K1105585-MB1	1.0	20	06/27/11	06/28/11	ND	
Method Blank2	K1105585-MB2	1.0	20	06/27/11	06/28/11	ND	
Method Blank3	K1105585-MB3	1.0	20	06/27/11	06/28/11	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	06/16/11
Sample Matrix:	Tissue	**Date Received:**	06/21/11
		Date Extracted:	06/29/11
		Date Analyzed:	06/30/11

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name:	061611UTRDVJ4		Units:	ng/g
Lab Code:	K1105585-009MS,	K1105585-009MSD	Basis:	Dry
Test Notes:				

Analyte	Prep Method	Analysis Method	MRL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Mercury	METHOD	1631E	1.0	265	267	21.1	296	276	104	95	70-130	7	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	06/16/11
Sample Matrix:	Tissue	**Date Received:**	06/21/11
		Date Extracted:	06/29/11
		Date Analyzed:	06/30/11

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name:	061611UTRDVJ8		Units:	ng/g
Lab Code:	K1105585-012MS	K1105585-012MSD	Basis:	Dry
Test Notes:				

Analyte	Prep Method	Analysis Method	MRL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Mercury	METHOD	1631E	2.0	252	253	67.2	296	280	91	84	70-130	6	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	06/30/11

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Initial)

Units: ng/L
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	4.83	97	70-130	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	06/30/11

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Final)

Units: ng/L
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	5.28	106	70-130	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	06/29/11
		Date Analyzed:	06/30/11

Quality Control Sample (QCS) Summary
Total Metals

Sample Name: Quality Control Sample

Units: ng/g
Basis: Dry

Test Notes:

Source: NRCC Tort-2

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	270	218	81	70-130	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	06/16/11
Sample Matrix:	Tissue	**Date Received:**	06/21/11
		Date Extracted:	06/29/11
		Date Analyzed:	06/30/11

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name:	061611TRMDVJ13		Units:	ng/g
Lab Code:	K1105585-021MS,	K1105585-021MSD	Basis:	Dry
Test Notes:				

Analyte	Prep Method	Analysis Method	MRL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Mercury	METHOD	1631E	2.0	251	251	59.8	316	265	102	82	70-130	18	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	06/16/11
Sample Matrix:	Tissue	**Date Received:**	06/21/11
		Date Extracted:	06/29/11
		Date Analyzed:	06/30/11

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name:	061611TRMDVJ5		Units:	ng/g
Lab Code:	K1105585-040MS	K1105585-040MSD	Basis:	Dry
Test Notes:				

Analyte	Prep Method	Analysis Method	MRL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Mercury	METHOD	1631E	2.0	249	253	62.8	295	312	93	98	70-130	6	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	06/30/11

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Initial)

Units: ng/L
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	5.25	105	70-130	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	06/30/11

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Final)

Units: ng/L
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	5.91	118	70-130	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	06/29/11
		Date Analyzed:	06/30/11

Quality Control Sample (QCS) Summary
Total Metals

Sample Name: Quality Control Sample

Units: ng/g
Basis: Dry

Test Notes:

Source: NRCC Tort-2

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	270	256	95	70-130	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
Sample Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	06/27/11
		Date Analyzed:	06/28/11

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name:	Batch QC		Units:	ng/g
Lab Code:	K1105631-030MS,	K1105631-030MSD	Basis:	Dry
Test Notes:				

				Spike Level		Sample	Spike Result		Percent Recovery				
Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MS**	**DMS**	**Result**	**MS**	**DMS**	**MS**	**DMS**	**CAS Acceptance Limits**	**Relative Percent Difference**	**Result Notes**
Mercury	METHOD	1631E	2.0	26	26	6.2	30.1	31.5	92	97	70-130	5	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	06/28/11

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Initial)

Units: ng/L
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	5.09	102	70-130	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	06/28/11

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Final)

Units: ng/L
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	5.79	116	70-130	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	06/27/11
		Date Analyzed:	06/28/11

Quality Control Sample (QCS) Summary
Total Metals

Sample Name: Quality Control Sample

Units: ng/g
Basis: Dry

Test Notes:

Source: NRCC Tort-2

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	270	285	106	70-130	

Columbia Analytical Services

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INORGANIC ANALYSIS DATA PACKAGE

Client: Alaska Department of Fish and Game
Project Name: Fish Tissue Metals Analysis
Project No.:

Service Request: K1105585

Sample Name:	Lab Code:
061511UTRDVJ1	K1105585-001
061611UTRDVJ12	K1105585-002
061611UTRDVJ9	K1105585-003
061611UTRDVJ3	K1105585-004
061611UTRDVJ6	K1105585-005
061611UTRDVJ5	K1105585-006
061611UTRDVJ7	K1105585-007
061611UTRDVJ2	K1105585-008
061611UTRDVJ4	K1105585-009
061611UTRDVJ11	K1105585-010
061611UTRDVJ10	K1105585-011
061611UTRDVJ8	K1105585-012
061611UTRDVJ8D	K1105585-012D
061611UTRDVJ8S	K1105585-012S
060311TRBDVJ7	K1105585-013
061311TRBDVJ2	K1105585-014
061611TRMDVJ7	K1105585-015
061611TRMDVJ8	K1105585-016
061611TRMDVJ9	K1105585-017
061611TRMDVJ10	K1105585-018
061611TRMDVJ11	K1105585-019
061611TRMDVJ12	K1105585-020
061611TRMDVJ13	K1105585-021
061611TRMDVJ14	K1105585-022
061611TRMDVJ15	K1105585-023
061611TRMDVJ16	K1105585-024
061611TRMDVJ17	K1105585-025
061611TRMDVJ18	K1105585-026
061611TRMDVJ19	K1105585-027
061611TRMDVJ20	K1105585-028
061411TRBDVJ1	K1105585-029
060311TRBDVJ9	K1105585-030
061311TRBDVJ5	K1105585-031
061311TRBDVJ5D	K1105585-031D
061311TRBDVJ5S	K1105585-031S
061311TRBDVJ6	K1105585-032
061311TRBDVJ3	K1105585-033
061311TRBDVJ4	K1105585-034

Comments:

Approved By: _____ **Date:** 7/14/11

Columbia Analytical Services

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INORGANIC ANALYSIS DATA PACKAGE

Client: Alaska Department of Fish and Game
Project Name: Fish Tissue Metals Analysis
Project No.:

Service Request: K1105585

Sample Name:	Lab Code:
060311TRBDVJ8	K1105585-035
061611TRMDVJ1	K1105585-036
061611TRMDVJ2	K1105585-037
061611TRMDVJ3	K1105585-038
061611TRMDVJ4	K1105585-039
061611TRMDVJ5	K1105585-040
061611TRMDVJ6	K1105585-041
061611TRMDVJ6D	K1105585-041D
061611TRMDVJ6S	K1105585-041S
Method Blank	K1105585-MB1
Method Blank	K1105585-MB2
Method Blank	K1105585-MB3

Comments:

Approved By: _____ **Date:** 7/14/11

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/15/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061511UTRDVJ1 **Lab Code:** K1105585-001

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	1.47		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.375		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.81		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.635		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	3.3		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02		
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	115		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611UTRDVJ12 **Lab Code:** K1105585-002

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.145		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	2.76		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.065		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	4.8		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	118		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611UTRDVJ9 **Lab Code:** K1105585-003

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	1.00	5.0	06/27/11	07/11/11	1.00	U	
Cadmium	6020A	0.040	5.0	06/27/11	07/11/11	0.158		
Copper	6020A	0.20	5.0	06/27/11	07/11/11	3.78		
Lead	6020A	0.040	5.0	06/27/11	07/11/11	0.293		
Selenium	7010	2.0	10.0	06/27/11	07/13/11	2.9		
Silver	6020A	0.04	5.0	06/27/11	07/11/11	0.04	U	
Zinc	6020A	1.00	5.0	06/27/11	07/11/11	162		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611UTRDVJ3 **Lab Code:** K1105585-004

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.111		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.17		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.039		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	3.4		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02		
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	161		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611UTRDVJ6 **Lab Code:** K1105585-005

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.245		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.97		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.063		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	3.8		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	167		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611UTRDVJ5 **Lab Code:** K1105585-006

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.81		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.409		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.54		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.362		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	3.3		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	158		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611UTRDVJ7 **Lab Code:** K1105585-007

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.164		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	2.68		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.063		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.8		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	154		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611UTRDVJ2 **Lab Code:** K1105585-008

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.83		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.132		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.40		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.160		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	4.4		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	116		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611UTRDVJ4 **Lab Code:** K1105585-009

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.52		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.088		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.37		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.194		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.3		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	139		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611UTRDVJ11 **Lab Code:** K1105585-010

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.203		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.19		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.025		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	3.0		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	194		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611UTRDVJ10 **Lab Code:** K1105585-011

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.251		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.74		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.182		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.6		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	201		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611UTRDVJ8 **Lab Code:** K1105585-012

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.070		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	2.35		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.046		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.5		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	111		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/03/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 060311TRBDVJ7 **Lab Code:** K1105585-013

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.68		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.327		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.81		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.095		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.2		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	155		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/13/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061311TRBDVJ2 **Lab Code:** K1105585-014

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.80		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.133		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	5.84		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.086		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.6		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	134		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ7 **Lab Code:** K1105585-015

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.119		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.15		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.062		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.9		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	115		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ8 **Lab Code:** K1105585-016

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.69		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.150		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.39		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.076		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	3.8		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	145		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ9 **Lab Code:** K1105585-017

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.67		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.143		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.90		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.087		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.8		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	141		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ10 **Lab Code:** K1105585-018

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.85		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.343		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	5.09		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.111		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.9		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	149		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ11 **Lab Code:** K1105585-019

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	1.34		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.235		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.66		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.171		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	4.0		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	152		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ12 **Lab Code:** K1105585-020

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.98		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.164		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.57		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.064		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.7		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	154		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ13 **Lab Code:** K1105585-021

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	1.11		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.187		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.00		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.119		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	4.0		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	138		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ14 **Lab Code:** K1105585-022

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.112		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.64		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.064		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.8		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	110		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ15 **Lab Code:** K1105585-023

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.160		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.02		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.087		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	3.8		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	143		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ16 **Lab Code:** K1105585-024

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.75		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.163		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	6.04		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.048		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	4.1		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	144		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ17 **Lab Code:** K1105585-025

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.57		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.133		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.40		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.050		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.6		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	120		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ18 **Lab Code:** K1105585-026

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.80		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.100		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.64		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.197		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	1.9		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	167		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ19 **Lab Code:** K1105585-027

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.55		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.165		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.30		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.085		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.9		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	131		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ20 **Lab Code:** K1105585-028

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.82		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.175		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.03		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.152		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	3.8		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	155		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/15/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061411TRBDVJ1 **Lab Code:** K1105585-029

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.53		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.171		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.03		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.052		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.0		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	123		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/03/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 060311TRBDVJ9 **Lab Code:** K1105585-030

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	1.00	5.0	06/27/11	07/11/11	1.32		
Cadmium	6020A	0.040	5.0	06/27/11	07/11/11	0.236		
Copper	6020A	0.20	5.0	06/27/11	07/11/11	5.55		
Lead	6020A	0.040	5.0	06/27/11	07/11/11	0.128		
Selenium	7010	2.0	10.0	06/27/11	07/13/11	2.1		
Silver	6020A	0.04	5.0	06/27/11	07/11/11	0.04	U	
Zinc	6020A	1.00	5.0	06/27/11	07/11/11	115		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/13/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061311TRBDVJ5 **Lab Code:** K1105585-031

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.82		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.220		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.03		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.091		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.2		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	134		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/13/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061311TRBDVJ6 **Lab Code:** K1105585-032

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.66		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.137		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.13		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.113		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.5		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	113		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/13/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061311TRBDVJ3 **Lab Code:** K1105585-033

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.060		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	2.81		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.031		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	1.8		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	113		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/13/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061311TRBDVJ4 **Lab Code:** K1105585-034

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.63		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.388		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.30		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.124		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.4		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	131		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/03/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 060311TRBDVJ8 **Lab Code:** K1105585-035

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	1.11		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.352		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.01		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.413		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	4.7		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	109		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ1 **Lab Code:** K1105585-036

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.61		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.118		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	3.95		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.058		
Selenium	7010	1.0	10.0	06/27/11	07/13/11	2.5		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	157		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ2 **Lab Code:** K1105585-037

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.94		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.187		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	2.88		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.119		
Selenium	7010	1.0	10.0	06/27/11	07/14/11	4.9		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	96.8		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ3 **Lab Code:** K1105585-038

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.123		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	2.40		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.039		
Selenium	7010	1.0	10.0	06/27/11	07/14/11	3.7		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	88.9		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ4 **Lab Code:** K1105585-039

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	1.36		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.230		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	5.08		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.351		
Selenium	7010	1.0	10.0	06/27/11	07/14/11	3.5		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	118		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ5 **Lab Code:** K1105585-040

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.98		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.227		
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.93		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.067		
Selenium	7010	1.0	10.0	06/27/11	07/14/11	3.5		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	156		N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	06/16/11
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	06/21/11
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: 061611TRMDVJ6 **Lab Code:** K1105585-041

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.88		
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.235		*
Copper	6020A	0.10	5.0	06/27/11	07/11/11	4.14		
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.152		
Selenium	7010	1.0	10.0	06/27/11	07/14/11	3.9		
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	156		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1105585
Project No.:	NA	**Date Collected:**	
Project Name:	Fish Tissue Metals Analysis	**Date Received:**	
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: Method Blank 1 **Lab Code:** K1105585-MB1

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.020	U	
Copper	6020A	0.10	5.0	06/27/11	07/11/11	0.10	U	
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.020	U	
Selenium	7010	1.0	10.0	06/27/11	07/13/11	1.0	U	
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Alaska Department of Fish and Ga
Service Request: K1105585
Project No.: NA
Date Collected:
Project Name: Fish Tissue Metals Analysis
Date Received:
Matrix: TISSUE
Units: mg/Kg
Basis: DRY

Sample Name: Method Blank 2
Lab Code: K1105585-MB2

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.020	U	
Copper	6020A	0.10	5.0	06/27/11	07/11/11	0.10	U	
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.020	U	
Selenium	7010	1.0	10.0	06/27/11	07/13/11	1.0	U	
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	N

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client: Alaska Department of Fish and Ga
Service Request: K1105585
Project No.: NA
Date Collected:
Project Name: Fish Tissue Metals Analysis
Date Received:
Matrix: TISSUE
Units: mg/Kg
Basis: DRY

Sample Name: Method Blank 3
Lab Code: K1105585-MB3

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	
Cadmium	6020A	0.020	5.0	06/27/11	07/11/11	0.020	U	*
Copper	6020A	0.10	5.0	06/27/11	07/11/11	0.10	U	
Lead	6020A	0.020	5.0	06/27/11	07/11/11	0.020	U	
Selenium	7010	1.0	10.0	06/27/11	07/14/11	1.0	U	
Silver	6020A	0.02	5.0	06/27/11	07/11/11	0.02	U	
Zinc	6020A	0.50	5.0	06/27/11	07/11/11	0.50	U	

Comments:

Metals

- 5A -

SPIKE SAMPLE RECOVERY

Client: Alaska Department of Fish and Ga **Service Request:** K1105585

Project No.: NA **Units:** MG/KG

Project Name: Fish Tissue Metals Analysis **Basis:** DRY

Matrix: TISSUE

Sample Name: 061611UTRDVJ8S **Lab Code:** K1105585-012S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	75 - 125	17.0		0.50	U	16.53	102.8		6020A
Cadmium	75 - 125	4.870		0.070		4.95	97.0		6020A
Copper	75 - 125	24.5		2.35		24.75	89.5		6020A
Lead	75 - 125	44.3		0.046		49.50	89.4		6020A
Selenium	70 - 130	19.6		2.5		16.53	103.4		7010
Silver	75 - 125	4.44		0.02	U	4.95	89.7		6020A
Zinc	75 - 125	156		111		49.50	90.9		6020A

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

- 5A -

SPIKE SAMPLE RECOVERY

Client: Alaska Department of Fish and Ga **Service Request:** K1105585

Project No.: NA **Units:** MG/KG

Project Name: Fish Tissue Metals Analysis **Basis:** DRY

Matrix: TISSUE

Sample Name: 061311TRBDVJ5S **Lab Code:** K1105585-031S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	75 - 125	16.4		0.82		16.53	94.3		6020A
Cadmium	75 - 125	4.530		0.220		4.95	87.1		6020A
Copper	75 - 125	22.6		3.03		24.75	79.1		6020A
Lead	75 - 125	40.1		0.091		49.50	80.8		6020A
Selenium	70 - 130	16.0		2.2		16.53	83.5		7010
Silver	75 - 125	3.93		0.02	U	4.95	79.4		6020A
Zinc	75 - 125	163		134		49.50	58.6	N	6020A

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

- 5A -

SPIKE SAMPLE RECOVERY

Client: Alaska Department of Fish and Ga **Service Request:** K1105585

Project No.: NA **Units:** MG/KG

Project Name: Fish Tissue Metals Analysis **Basis:** DRY

Matrix: TISSUE

Sample Name: 061611TRMDVJ6S **Lab Code:** K1105585-041S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	75 - 125	18.9		0.88		16.59	108.6		6020A
Cadmium	75 - 125	5.370		0.235		4.97	103.3		6020A
Copper	75 - 125	27.8		4.14		24.83	95.3		6020A
Lead	75 - 125	47.9		0.152		49.67	96.1		6020A
Selenium	70 - 130	19.8		3.9		16.59	95.8		7010
Silver	75 - 125	4.75		0.02	U	4.97	95.2		6020A
Zinc	75 - 125	208		156		49.67	104.7		6020A

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

- 6 -

DUPLICATES

Client: Alaska Department of Fish and Ga **Service Request:** K1105585

Project No.: NA **Units:** MG/KG

Project Name: Fish Tissue Metals Analysis **Basis:** DRY

Matrix: TISSUE

Sample Name: 061611UTRDVJ8D **Lab Code:** K1105585-012D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		0.50	U	0.50	U			6020A
Cadmium		0.070		0.062		12.1		6020A
Copper	20	2.35		2.40		2.1		6020A
Lead		0.046		0.032		35.9		6020A
Selenium		2.5		2.3		8.3		7010
Silver		0.02	U	0.02	U			6020A
Zinc	20	111		115		3.5		6020A

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

- 6 -

DUPLICATES

Client: Alaska Department of Fish and Ga **Service Request:** K1105585

Project No.: NA **Units:** MG/KG

Project Name: Fish Tissue Metals Analysis **Basis:** DRY

Matrix: TISSUE

Sample Name: 061311TRBDVJ5D **Lab Code:** K1105585-031D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		0.82		0.91		10.4		6020A
Cadmium	20	0.220		0.207		6.1		6020A
Copper	20	3.03		3.06		1.0		6020A
Lead		0.091		0.071		24.7		6020A
Selenium		2.2		2.1		4.7		7010
Silver		0.02	U	0.02	U			6020A
Zinc	20	134		128		4.6		6020A

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

- 6 -

DUPLICATES

Client: Alaska Department of Fish and Ga **Service Request:** K1105585

Project No.: NA **Units:** MG/KG

Project Name: Fish Tissue Metals Analysis **Basis:** DRY

Matrix: TISSUE

Sample Name: 061611TRMDVJ6D **Lab Code:** K1105585-041D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		0.88		0.94		6.6		6020A
Cadmium	20	0.235		0.363		42.8	*	6020A
Copper	20	4.14		4.25		2.6		6020A
Lead	20	0.152		0.141		7.5		6020A
Selenium		3.9		4.3		9.8		7010
Silver		0.02	U	0.02	U			6020A
Zinc	20	156		160		2.5		6020A

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

LABORATORY CONTROL SAMPLE

Client: Alaska Department of Fish and Ga **Service Request:** K1105585

Project No.: NA

Project Name: Fish Tissue Metals Analysis

Aqueous LCS Source: CAS MIXED **Solid LCS Source:**

Analyte	Aqueous: ug/L			Solid: mg/kg				
	True	Found	%R	True	Found	C	Limits	%R
Arsenic	167	159	95.2					
Cadmium	50	48.0	96.0					
Copper	250	235	94.0					
Lead	500	472	94.4					
Selenium	167	180	107.8					
Silver	50	46.4	92.8					
Zinc	500	473	94.6					

Metals

LABORATORY CONTROL SAMPLE

Client: Alaska Department of Fish and Ga **Service Request:** K1105585

Project No.: NA

Project Name: Fish Tissue Metals Analysis

Aqueous LCS Source: CAS MIXED **Solid LCS Source:**

Analyte	Aqueous: ug/L			Solid: mg/kg				
	True	Found	%R	True	Found	C	Limits	%R
Arsenic	167	168	100.6					
Cadmium	50	47.9	95.8					
Copper	250	237	94.8					
Lead	500	476	95.2					
Selenium	167	168	100.6					
Silver	50	46.4	92.8					
Zinc	500	488	97.6					

Metals

LABORATORY CONTROL SAMPLE

Client: Alaska Department of Fish and Ga **Service Request:** K1105585

Project No.: NA

Project Name: Fish Tissue Metals Analysis

Aqueous LCS Source: CAS MIXED **Solid LCS Source:**

Analyte	Aqueous: ug/L			Solid: mg/kg				
	True	Found	%R	True	Found	C	Limits	%R
Arsenic	167	165	98.8					
Cadmium	50	48.5	97.0					
Copper	250	236	94.4					
Lead	500	480	96.0					
Selenium	167	170	101.8					
Silver	50	46.1	92.2					
Zinc	500	489	97.8					

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	06/27/11
		Date Analyzed:	07/11/11

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1105585-SRM1	Basis:	Dry
Test Notes:			

Source: N.R.C.C. Dorm-3

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	6020A	6.88	7.05	102	5.26 - 8.62	
Cadmium	PSEP Tissue	6020A	0.29	0.32	110	0.216 - 0.372	
Copper	PSEP Tissue	6020A	15.5	14.5	94	11.9 - 19.4	
Lead	PSEP Tissue	6020A	0.395	0.318	81	0.276 - 0.534	
Zinc	PSEP Tissue	6020A	51.3	48.3	94	38.6 - 65.3	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	06/27/11
		Date Analyzed:	07/11-14/11

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1105585-SRM2	Basis:	Dry
Test Notes:			

Source: N.R.C.C. Tort-2

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	6020A	21.6	22.0	102	15.8-28.1	
Cadmium	PSEP Tissue	6020A	26.7	27.6	103	20.9-32.8	
Copper	PSEP Tissue	6020A	106	99.1	93	77-139	
Lead	PSEP Tissue	6020A	0.35	0.44	126	0.18-0.58	
Selenium	PSEP Tissue	7010	5.63	7.07	126	3.97-7.56	
Zinc	PSEP Tissue	6020A	180	185	103	139-223	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	06/27/11
		Date Analyzed:	07/11/11

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1105585-SRM3	Basis:	Dry
Test Notes:			

Source: N.R.C.C. Dorm-3

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	6020A	6.88	6.78	99	5.26 - 8.62	
Cadmium	PSEP Tissue	6020A	0.29	0.31	107	0.216 - 0.372	
Copper	PSEP Tissue	6020A	15.5	14.6	94	11.9 - 19.4	
Lead	PSEP Tissue	6020A	0.395	0.378	96	0.276 - 0.534	
Zinc	PSEP Tissue	6020A	51.3	51.1	100	38.6 - 65.3	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	06/27/11
		Date Analyzed:	07/11-14/11

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1105585-SRM4	Basis:	Dry
Test Notes:			

Source: N.R.C.C. Tort-2

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	6020A	21.6	21.5	100	15.8-28.1	
Cadmium	PSEP Tissue	6020A	26.7	27.7	104	20.9-32.8	
Copper	PSEP Tissue	6020A	106	97.2	92	77-139	
Lead	PSEP Tissue	6020A	0.35	0.29	83	0.18-0.58	
Selenium	PSEP Tissue	7010	5.63	5.41	96	3.97-7.56	
Zinc	PSEP Tissue	6020A	180	195	108	139-223	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	06/27/11
		Date Analyzed:	07/11/11

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1105585-SRM5	Basis:	Dry
Test Notes:			

Source: N.R.C.C. Dorm-3

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	6020A	6.88	6.93	101	5.26 - 8.62	
Cadmium	PSEP Tissue	6020A	0.29	0.30	103	0.216 - 0.372	
Copper	PSEP Tissue	6020A	15.5	14.5	94	11.9 - 19.4	
Lead	PSEP Tissue	6020A	0.395	0.375	95	0.276 - 0.534	
Zinc	PSEP Tissue	6020A	51.3	51.3	100	38.6 - 65.3	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1105585
Project:	Fish Tissue Metals Analysis	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	06/27/11
		Date Analyzed:	07/11-14/11

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1105585-SRM6	Basis:	Dry
Test Notes:			

Source: N.R.C.C. Tort-2

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	6020A	21.6	22.1	102	15.8-28.1	
Cadmium	PSEP Tissue	6020A	26.7	27.9	104	20.9-32.8	
Copper	PSEP Tissue	6020A	106	98.1	93	77-139	
Lead	PSEP Tissue	6020A	0.35	0.33	94	0.18-0.58	
Selenium	PSEP Tissue	7010	5.63	5.81	103	3.97-7.56	
Zinc	PSEP Tissue	6020A	180	195	108	139-223	

ALS Environmental
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September 25, 2014 Analytical Report for Service Request No: K1409191

Nicole Legere
Alaska Department of Fish and Game
Division of Habitat/ Billy Ray Center
1008 F Street
P.O. Box 110024
Juneau, AK 99801

RE: Tulsequah Chief Mine Water Quality and Aquatic Studies

Dear Nicole:

Enclosed are the results of the samples submitted to our laboratory on August 28, 2014. For your reference, these analyses have been assigned our service request number K1409191.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please call if you have any questions. My extension is 3363. You may also contact me via Email at Lisa.Domenighini@alsglobal.com.

Respectfully submitted,

ALS Group USA Corp. dba ALS Environmental

Lisa A Domenighini

Lisa Domenighini
Project Manager

LD/kd

RIGHT SOLUTIONS | RIGHT PARTNER

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
ISO 17025	http://www.pjlabs.com/	L14-50
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

ALS ENVIRONMENTAL

Client:	Alaska Department of Fish and Game	**Service Request No.:**	K1409191
Project:	Tulsequah Chief Mine/ Water Quality and Aquatic Studies	**Date Received:**	8/28/14
Sample Matrix:	Animal Tissue		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), and Laboratory Control Sample (LCS).

Sample Receipt

Seventeen animal tissue samples were received for analysis at ALS Environmental on 8/28/14. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored frozen at –20ºC upon receipt at the laboratory.

Total Metals

Standard Reference Material Exceptions:
The recovery of Lead in the Standard Reference Material (SRM) N.R.C.C. Dorm-4 was below the normal ALS/Kelso control limit (i.e. 0.271 mg/kg versus a control limit of 0.290 mg/kg). However, the concentration of Lead in the SRM is relatively low compared to the sensitivity of the analytical procedure. The associated QA/QC results (e.g. SRM N.R.C.C. Tort-3, LCS, matrix spike, method blank, calibration standards, etc.) indicate the analysis was in control. No further corrective action was appropriate.

No other anomalies associated with the analysis of these samples were observed.

Approved by___ Lisa A. Domenighini

ALS Environmental

CHAIN OF CUSTODY

1317 South 13th Ave., Kelso, WA 98626 | 360.577.7222 | 800.695.7222 | 360.636.1068 (fax)

SR# _____

PAGE 1 OF 1 COC# _____

PROJECT NAME: Tulsequah Chief Mine Water Quality and Aquatic Studies
PROJECT NUMBER:
PROJECT MANAGER: Jackie Timothy
COMPANY NAME: Alaska Dept. of Fish & Game Habitat
ADDRESS: 1108 F. Street Room 153
CITY/STATE/ZIP: Juneau, AK 99801
E-MAIL ADDRESS: nicole.legere@alaska.gov
PHONE #: 907-465-6979 FAX #: 907-465-4759
SAMPLER'S SIGNATURE: Nicole Legere

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐ SIM PAH☐	Volatile Organics 624☐ 8260☐ 8021☐ BTEX☐	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCBs Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081☐ 8141☐ 8151☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	Metals, Total or Dissolved (See List below)	Cyanide☐ Hex-Chrom☐	(circle) pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS, Turb.	(circle) NH_3-N, COD, TKN, TOC, DOC, NO_2+NO_3, T-Phos	TOX 9020☐ AOX 1650☐ 506☐	Alkalinity☐ CO_3☐ HCO_3☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases RSK 175☐ Methane☐ Ethane☐ Ethene☐ CO_2☐				REMARKS
See attached		list of			17								X											
juvenile		fish, whole																						
body samples																								

REPORT REQUIREMENTS

X I. Routine Report: Method Blank, Surrogate, as required
X II. Report Dup., MS, MSD as required
___ III. CLP Like Summary (no raw data)
___ IV. Data Validation Report
___ V. EDD

INVOICE INFORMATION

P.O. # 11-J-027-15
Bill To: PO Box 110024 Juneau, AK 99811-0024

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 day
X Standard (15 working days)
___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al (As) Sb Ba Be B Ca (Cd) Co Cr (Cu) Fe (Pb) Mg Mn Mo Ni K (Ag) Na (Se) Sr Tl Sn V (Zn) (Hg)

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: _____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS: Dry weight basis, report % moisture. Process each sample bag as an individual test. Sample bags containing two fish process as a composite. Send e copy and hard copy to Nicole Legere PO Box 110024 Juneau, AK 99811-0024 nicole.legere@alaska.gov

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Nicole Legere 8/26/14	Karla Smith 8/27/14 0900		
Signature / Date/Time	Signature / Date/Time	Signature / Date/Time	Signature / Date/Time
Nicole Legere ADF&G	Karla Smith ALS		
Printed Name / Firm	Printed Name / Firm	Printed Name / Firm	Printed Name / Firm

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Tulsequah Chief Mine Water Quality and Aquatic Studies
Juvenile Fish for Whole Body Metals
Basis, all samples: Dry Weight, Report % Moisture
Requested Analysis: Ag,As,Cd,Cu,Hg,Pb,Se,Zn

Matrix	Collector	Date Collected	Sample Number	Sample Location	Requested Analysis	FK Length (mm)	Weight (g)	Note
Whole Body	ADF&G	8/21/2014	082114UTRDVJ1	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	125	19.16	
Whole Body	ADF&G	8/21/2014	082114UTRDVJ2	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	125	17.11	
Whole Body	ADF&G	8/22/2014	082214UTRDVJ3	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	115	18.24	
Whole Body	ADF&G	8/22/2014	082214UTRDVJ4	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	115	15.61	
Whole Body	ADF&G	8/22/2014	082214UTRDVJ5	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	107	12.59	
Whole Body	ADF&G	8/22/2014	082214UTRDVJ6	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	78	5.2	
Whole Body	ADF&G	8/21/2014	082114TRMDVJ1	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	93	8.51	
Whole Body	ADF&G	8/21/2014	082114TRMDVJ2	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	83/57	7.36	Two fish (composite)
Whole Body	ADF&G	8/21/2014	082114TRMDVJ3	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	95	8.18	
Whole Body	ADF&G	8/21/2014	082114TRMDVJ4	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	96	7.2	
Whole Body	ADF&G	8/21/2014	082114TRMDVJ5	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	100	9.92	
Whole Body	ADF&G	8/21/2014	082114TRMDVJ6	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	107	11.21	
Whole Body	ADF&G	8/21/2014	082114TRMDVJ7	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	88	6.86	
Whole Body	ADF&G	8/21/2014	082114TRMDVJ8	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	70/56	6.04	Two fish (composite)
Whole Body	ADF&G	8/21/2014	082114TRMDVJ9	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	80/64	8.1	Two fish (composite)
Whole Body	ADF&G	8/21/2014	082114TRMDVJ10	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	77	5.27	
Whole Body	ADF&G	8/21/2014	082114TRBDVJ1	Taku River Boundary	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	122	19.37	

PC Lisa

Cooler Receipt and Preservation Form

Client / Project: Alaska Dept of Fish & Game Service Request *K14* 9191

Received: 8/28/14 Opened: 8/28/14 By: KO Unloaded: 8/28/14 By: KO

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? 1, Front

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected. Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
-.6	-.4	—	—	+.2	322		8061 7252 7436	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Page ____ *of* ____

ALS Group USA, Corp.
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Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1409191
Project:	Tulsequah Chief Mine Water Quality and Aquatic Stu	**Date Collected:**	08/21/14 - 08/22/14
Sample Matrix:	Animal Tissue	**Date Received:**	08/28/14
Analysis Method:	Calculation	**Units:**	Percent
Prep Method:	None	**Basis:**	Wet

Moisture

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
082114UTRDVJ1	K1409191-001	**78.6**	-	1	NA	
082114UTRDVJ2	K1409191-002	**82.1**	-	1	NA	
082214UTRDVJ3	K1409191-003	**76.7**	-	1	NA	
082214UTRDVJ4	K1409191-004	**76.8**	-	1	NA	
082214UTRDVJ5	K1409191-005	**77.6**	-	1	NA	
082214UTRDVJ6	K1409191-006	**80.3**	-	1	NA	
082114TRMDVJ1	K1409191-007	**78.2**	-	1	NA	
082114TRMDVJ2	K1409191-008	**78.6**	-	1	NA	
082114TRMDVJ3	K1409191-009	**78.2**	-	1	NA	
082114TRMDVJ4	K1409191-010	**78.7**	-	1	NA	
082114TRMDVJ5	K1409191-011	**76.2**	-	1	NA	
082114TRMDVJ6	K1409191-012	**76.2**	-	1	NA	
082114TRMDVJ7	K1409191-013	**77.5**	-	1	NA	
082114TRMDVJ8	K1409191-014	**79.6**	-	1	NA	
082114TRMDVJ9	K1409191-015	**78.1**	-	1	NA	
082114TRMDVJ10	K1409191-016	**76.9**	-	1	NA	
082114TRBDVJ1	K1409191-017	**77.1**	-	1	NA	

ALS Group USA, Corp.
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Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1409191
Project:	Tulsequah Chief Mine Water Quality and Aquatic Stu	**Date Collected:**	08/21/14 - 08/22/14
Sample Matrix:	Animal Tissue	**Date Received:**	08/28/14
Analysis Method:	Freeze Dry	**Units:**	Percent
Prep Method:	None	**Basis:**	Wet

Total Solids

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
082114UTRDVJ1	K1409191-001	**21.4**	-	1	08/29/14 16:38	
082114UTRDVJ2	K1409191-002	**17.9**	-	1	08/29/14 16:38	
082214UTRDVJ3	K1409191-003	**23.3**	-	1	08/29/14 16:38	
082214UTRDVJ4	K1409191-004	**23.2**	-	1	08/29/14 16:38	
082214UTRDVJ5	K1409191-005	**22.4**	-	1	08/29/14 16:38	
082214UTRDVJ6	K1409191-006	**19.7**	-	1	08/29/14 16:38	
082114TRMDVJ1	K1409191-007	**21.8**	-	1	08/29/14 16:38	
082114TRMDVJ2	K1409191-008	**21.4**	-	1	08/29/14 16:38	
082114TRMDVJ3	K1409191-009	**21.8**	-	1	08/29/14 16:38	
082114TRMDVJ4	K1409191-010	**21.3**	-	1	08/29/14 16:38	
082114TRMDVJ5	K1409191-011	**23.8**	-	1	08/29/14 16:38	
082114TRMDVJ6	K1409191-012	**23.8**	-	1	08/29/14 16:38	
082114TRMDVJ7	K1409191-013	**22.5**	-	1	08/29/14 16:38	
082114TRMDVJ8	K1409191-014	**20.4**	-	1	08/29/14 16:38	
082114TRMDVJ9	K1409191-015	**21.9**	-	1	08/29/14 16:38	
082114TRMDVJ10	K1409191-016	**23.1**	-	1	08/29/14 16:38	
082114TRBDVJ1	K1409191-017	**22.9**	-	1	08/29/14 16:38	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1409191
Project	Tulsequah Chief Mine Water Quality and Aquatic Stu	**Date Collected:**	08/21/14
Sample Matrix:	Animal Tissue	**Date Received:**	08/28/14
Analysis Method:	Freeze Dry	**Units:**	Percent
Prep Method:	None	**Basis:**	Wet

Replicate Sample Summary
Inorganic Parameters

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
082114UTRDVJ1	K1409191-001DUP	-	21.4	22.0	21.7	3	20	08/29/14
082114UTRDVJ2	K1409191-002DUP	-	17.9	18.5	18.2	3	20	08/29/14

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1409191
Project:	Tulsequah Chief Mine Water Quality and Aquatic Stu	**Date Collected:**	08/21/14
Sample Matrix:	Animal tissue	**Date Received:**	08/28/14

Mercury, Total

Prep Method:	METHOD	Units:	ng/g
Analysis Method:	1631E	Basis:	Dry
Test Notes:			

Sample Name	Lab Code	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
082114UTRDVJ1	K1409191-001	2.4	2.5	09/09/14	09/10/14	36.7	
082114UTRDVJ2	K1409191-002	9.5	10	09/09/14	09/10/14	106	
082214UTRDVJ3	K1409191-003	2.4	2.5	09/09/14	09/10/14	26.9	
082214UTRDVJ4	K1409191-004	2.4	2.5	09/09/14	09/10/14	21.0	
082214UTRDVJ5	K1409191-005	2.4	2.5	09/09/14	09/10/14	39.6	
082214UTRDVJ6	K1409191-006	3.6	2.5	09/09/14	09/10/14	58.5	
082114TRMDVJ1	K1409191-007	2.4	2.5	09/09/14	09/10/14	33.0	
082114TRMDVJ2	K1409191-008	2.5	2.5	09/09/14	09/10/14	36.5	
082114TRMDVJ3	K1409191-009	2.4	2.5	09/09/14	09/10/14	44.2	
082114TRMDVJ4	K1409191-010	2.4	2.5	09/09/14	09/10/14	35.3	
082114TRMDVJ5	K1409191-011	2.4	2.5	09/09/14	09/10/14	26.8	
082114TRMDVJ6	K1409191-012	9.7	10	09/09/14	09/10/14	54.1	
082114TRMDVJ7	K1409191-013	2.5	2.5	09/09/14	09/10/14	43.2	
082114TRMDVJ8	K1409191-014	2.4	2.5	09/09/14	09/10/14	36.9	
082114TRMDVJ9	K1409191-015	2.5	2.5	09/09/14	09/10/14	41.0	
082114TRMDVJ10	K1409191-016	2.4	2.5	09/09/14	09/10/14	27.7	
082114TRBDVJ1	K1409191-017	9.7	10	09/09/14	09/10/14	60.1	
Method Blank 1	K1409191-MB1	1.0	1	09/09/14	09/10/14	ND	
Method Blank 2	K1409191-MB2	1.0	1	09/09/14	09/10/14	ND	
Method Blank 3	K1409191-MB3	1.0	1	09/09/14	09/10/14	ND	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1409191
Project:	Tulsequah Chief Mine Water Quality and Aquatic Stu	**Date Collected:**	08/21/14
Sample Matrix:	Animal tissue	**Date Received:**	08/28/14
		Date Extracted:	09/09/14
		Date Analyzed:	09/10/14

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name: 082114UTRDVJ1 Units: ng/g
Lab Code: K1409191-001MS, K1409191-001MSD Basis: Dry
Test Notes:

				Spike Level		Sample	Spike Result		Percent Recovery				
Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MS**	**DMS**	**Result**	**MS**	**DMS**	**MS**	**DMS**	**ALS Acceptance Limits**	**Relative Percent Difference**	**Result Notes**
Mercury	METHOD	1631E	9.8	241	244	36.7	289	292	105	105	70-130	<1	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1409191
Project:	Tulsequah Chief Mine Water Quality and Aquatic Stu	**Date Collected:**	08/21/14
Sample Matrix:	Animal tissue	**Date Received:**	08/28/14
		Date Extracted:	09/09/14
		Date Analyzed:	09/10/14

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name: 082114TRBDVJ1 Units: ng/g
Lab Code: K1409191-017MS, K1409191-017MSD Basis: Dry
Test Notes:

				Spike Level		Sample	Spike Result		Percent Recovery				
Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MS**	**DMS**	**Result**	**MS**	**DMS**	**MS**	**DMS**	**ALS Acceptance Limits**	**Relative Percent Difference**	**Result Notes**
Mercury	METHOD	1631E	9.8	244	245	60.1	303	300	100	98	70-130	2	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1409191
Project:	Tulsequah Chief Mine Water Quality and Aquatic Stu	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	09/10/14

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Initial)

Units: ng/g
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	4.64	93	70-130	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1409191
Project:	Tulsequah Chief Mine Water Quality and Aquatic Stu	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	09/10/14

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Final)

Units: ng/g
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	4.87	97	70-130	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1409191
Project:	Tulsequah Chief Mine Water Quality and Aquatic Stu	**Date Collected:**	NA
LCS Matrix:	Animal tissue	**Date Received:**	NA
		Date Extracted:	09/09/14
		Date Analyzed:	09/10/14

Quality Control Sample (QCS) Summary
Total Metals

Sample Name:	Quality Control Sample	Units:	ng/g
Lab Code:		Basis:	Dry
Test Notes:			

Source: TORT-3

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	292	263	90	70-130	

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/21/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082114UTRDVJ1** **Lab Code:** **K1409191-001**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.6		
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.07		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	3.1		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.18		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	1.9		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	116		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/21/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082114UTRDVJ2** **Lab Code:** **K1409191-002**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.5	U	
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.36		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	9.7		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.10		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	2.5		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.20		
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	264		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/22/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082214UTRDVJ3** **Lab Code:** **K1409191-003**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.5	U	
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.06		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	2.6		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.05		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	3.4		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	123		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/22/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082214UTRDVJ4** **Lab Code:** **K1409191-004**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.5	U	
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.09		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	2.8		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.07		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	3.2		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	132		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/22/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082214UTRDVJ5** **Lab Code:** **K1409191-005**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.9		
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.15		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	4.3		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.38		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	2.1		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	122		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/22/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082214UTRDVJ6** **Lab Code:** **K1409191-006**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	1.3		
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.43		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	3.6		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.20		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	2.4		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	164		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/21/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082114TRMDVJ1** **Lab Code:** **K1409191-007**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.5	U	
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.35		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	3.2		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.05		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	2.7		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	149		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/21/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082114TRMDVJ2** **Lab Code:** **K1409191-008**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.6		
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.37		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	3.0		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.08		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	4.0		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	123		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/21/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082114TRMDVJ3** **Lab Code:** **K1409191-009**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.5	U	
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.27		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	4.4		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.08		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	2.7		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	154		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/21/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082114TRMDVJ4** **Lab Code:** **K1409191-010**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.6		
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.24		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	3.4		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.12		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	2.7		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	133		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/21/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082114TRMDVJ5** **Lab Code:** **K1409191-011**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.7		
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.15		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	2.9		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.05		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	2.4		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	141		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/21/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082114TRMDVJ6** **Lab Code:** **K1409191-012**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.5	U	
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.12		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	2.3		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.03		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	2.4		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	114		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/21/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082114TRMDVJ7** **Lab Code:** **K1409191-013**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.6		
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.30		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	3.5		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.11		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	3.4		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	119		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/21/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082114TRMDVJ8** **Lab Code:** **K1409191-014**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.9		
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.37		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	5.3		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.22		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	2.8		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	154		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/21/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082114TRMDVJ9** **Lab Code:** **K1409191-015**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.7		
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.49		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	3.5		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.06		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	2.8		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	112		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/21/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082114TRMDVJ10** **Lab Code:** **K1409191-016**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.5	U	
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.34		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	3.5		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.07		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	6.4		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.04		
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	143		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	08/21/14
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	08/28/14
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **082114TRBDVJ1** **Lab Code:** **K1409191-017**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	1.3		
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.36		
Copper	200.8	0.1	5.0	09/02/14	09/13/14	3.1		
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.10		
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	2.9		
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	143		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1409191
Project No.:	NA	**Date Collected:**	
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **Method Blank** **Lab Code:** **K1409191-MB**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	09/02/14	09/13/14	0.5	U	
Cadmium	200.8	0.02	5.0	09/02/14	09/13/14	0.02	U	
Copper	200.8	0.1	5.0	09/02/14	09/13/14	0.1	U	
Lead	200.8	0.02	5.0	09/02/14	09/13/14	0.02	U	
Selenium	200.8	1.0	5.0	09/02/14	09/13/14	1.0	U	
Silver	200.8	0.02	5.0	09/18/14	09/23/14	0.02	U	
Zinc	200.8	0.5	5.0	09/02/14	09/13/14	0.5	U	

Comments:

Metals
- 5A -
SPIKE SAMPLE RECOVERY

Client: Alaska Department of Fish and Ga **Service Request:** K1409191

Project No.: NA **Units:** MG/KG

Project Name: Tulsequah Chief Mine Water Quali **Basis:** DRY

Matrix: TISSUE

Sample Name: 082114UTRDVJ1S **Lab Code:** K1409191-001S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Silver	70 - 130	4.91		0.02	U	4.97	98.8		200.8

An empty field in the Control Limit column indicates the control limit is not applicable

Metals
- 5A -
SPIKE SAMPLE RECOVERY

Client: Alaska Department of Fish and Ga **Service Request:** K1409191

Project No.: NA **Units:** MG/KG

Project Name: Tulsequah Chief Mine Water Quali **Basis:** DRY

Matrix: TISSUE

Sample Name: 082214UTRDVJ3S **Lab Code:** K1409191-003S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	70 - 130	19.4		0.5	U	16.7	116.2		200.8
Cadmium	70 - 130	5.13		0.06		5.00	101.4		200.8
Copper	70 - 130	25.8		2.6		25.0	92.8		200.8
Lead	70 - 130	46.26		0.05		50.00	92.4		200.8
Selenium	70 - 130	22.1		3.4		16.7	112.0		200.8
Zinc	70 - 130	179.0		123.3		50.0	111.4		200.8

An empty field in the Control Limit column indicates the control limit is not applicable

Metals
- 5A -
SPIKE SAMPLE RECOVERY

Client: Alaska Department of Fish and Ga **Service Request:** K1409191

Project No.: NA **Units:** MG/KG

Project Name: Tulsequah Chief Mine Water Quali **Basis:** DRY

Matrix: TISSUE

Sample Name: 082114TRBDVJ1S **Lab Code:** K1409191-017S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	70 - 130	20.8		1.3		16.6	117.5		200.8
Cadmium	70 - 130	5.48		0.36		4.97	103.0		200.8
Copper	70 - 130	27.1		3.1		24.8	96.8		200.8
Lead	70 - 130	46.36		0.10		49.67	93.1		200.8
Selenium	70 - 130	21.2		2.9		16.6	110.2		200.8
Silver	70 - 130	5.16		0.02	U	5.00	103.2		200.8
Zinc	70 - 130	199.5		143.1		49.7	113.5		200.8

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

- 6 -

DUPLICATES

Client: Alaska Department of Fish and Ga **Service Request:** K1409191

Project No.: NA **Units:** MG/KG

Project Name: Tulsequah Chief Mine Water Quali **Basis:** DRY

Matrix: TISSUE

Sample Name: **082114UTRDVJ1D** **Lab Code:** **K1409191-001D**

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Silver		0.02	U	0.02	U			200.8

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

- 6 -

DUPLICATES

Client: Alaska Department of Fish and Ga **Service Request:** K1409191

Project No.: NA **Units:** MG/KG

Project Name: Tulsequah Chief Mine Water Quali **Basis:** DRY

Matrix: TISSUE

Sample Name: 082214UTRDVJ3D **Lab Code:** K1409191-003D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		0.5	U	0.5	U			200.8
Cadmium		0.06		0.07		15.4		200.8
Copper	30	2.6		3.0		14.3		200.8
Lead		0.05		0.07		33.3		200.8
Selenium		3.4		3.4		0.0		200.8
Zinc	30	123.3		127.6		3.4		200.8

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

- 6 -

DUPLICATES

Client: Alaska Department of Fish and Ga **Service Request:** K1409191

Project No.: NA **Units:** MG/KG

Project Name: Tulsequah Chief Mine Water Quali **Basis:** DRY

Matrix: TISSUE

Sample Name: 082114TRBDVJ1D **Lab Code:** K1409191-017D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		1.3		1.0		26.1		200.8
Cadmium	30	0.36		0.36		0.0		200.8
Copper	30	3.1		3.6		14.9		200.8
Lead		0.10		0.12		18.2		200.8
Selenium		2.9		2.8		3.5		200.8
Silver		0.02	U	0.02	U			200.8
Zinc	30	143.1		137.4		4.1		200.8

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

- 7 -

LABORATORY CONTROL SAMPLE

Client: Alaska Department of Fish and Ga **Service Request:** K1409191

Project No.: NA

Project Name: Tulsequah Chief Mine Water Quali

Aqueous LCS Source: ALS MIXED **Solid LCS Source:**

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits	%R
Arsenic	167.0	189.5	113.5					
Cadmium	50.0	48.5	97.0					
Copper	250.0	237.1	94.8					
Lead	500.0	481.0	96.2					
Selenium	167.0	178.0	106.6					
Silver	50.0	51.6	103.2					
Zinc	500.0	501.4	100.3					

ALS Group USA, Corp.
dba ALS Environmental
QA/QC Report

Client:	Alaska Deparment of Fish And Game	**Service Request:**	K1409191
Project:	Tulsequah Chief Mine Water Quality and Aquatic	**Date Collected:**	
LCS Matrix:	Tissue	**Date Received:**	
		Date Extracted:	09/02/14
		Date Analyzed:	09/13/14

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1409191-SRM1	Basis:	Dry
Test Notes:	Dorm-4 Solids = 94.5%		

Source: N.R.C.C. Dorm-4

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	200.8	6.80	7.46	110	4.93 - 8.93	
Cadmium	PSEP Tissue	200.8	0.306	0.330	108	0.233 - 0.385	
Copper	PSEP Tissue	200.8	15.9	15.7	99	12.0 - 20.2	
Lead	PSEP Tissue	200.8	0.416	0.271	65	0.290 - 0.563	X
Selenium	PSEP Tissue	200.8	3.56	4.48	126	2.58 - 4.68	
Zinc	PSEP Tissue	200.8	52.20	56.8	109	39.2 - 66.5	

ALS Group USA, Corp.
dba ALS Environmental
QA/QC Report

Client:	Alaska Deparment of Fish And Game	**Service Request:**	K1409191
Project:	Tulsequah Chief Mine Water Quality and Aquatic	**Date Collected:**	
LCS Matrix:	Tissue	**Date Received:**	
		Date Extracted:	09/02/14
		Date Analyzed:	09/13/14

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1409191-SRM2	Basis:	Dry
Test Notes:	Tort-3 Solids = 99.1%		

Source: N.R.C.C. Tort-3

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	200.8	59.5	66.1	111	44.6 - 76.0	
Cadmium	PSEP Tissue	200.8	42.3	39.8	94	32.4 - 52.9	
Copper	PSEP Tissue	200.8	497	415	84	380 - 623	
Lead	PSEP Tissue	200.8	0.225	0.175	78	0.166 - 0.292	
Selenium	PSEP Tissue	200.8	10.90	11.5	106	7.9 - 14.3	
Zinc	PSEP Tissue	200.8	136	131	96	104 - 170	

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July 20, 2015

Analytical Report for Service Request No: K1506755

Nicole Legere
Alaska Department of Fish and Game
Division of Habitat/ Billy Ray Center
1008 F Street
P.O. Box 110024
Juneau, AK 99801

RE: Tulsequah Chief Mine H20 Quality & Aquatic Studies

Dear Nicole,

Enclosed are the results of the sample(s) submitted to our laboratory June 23, 2015
For your reference, these analyses have been assigned our service request number **K1506755.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3293. You may also contact me via email at Shar.Samy@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Shar Samy, Ph.D.
Project Manager

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
ISO 17025	http://www.pjlabs.com/	L14-50
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
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ALS ENVIRONMENTAL

Client:	Alaska Department of Fish and Game	**Service Request No.:**	K1506755
Project:	Tulsequah Chief Mine H20 Quality & Aquatic Study	**Date Received:**	06/23/15
Sample Matrix:	Animal Tissue		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), and Matrix/Duplicate Matrix Spike (MS/DMS).

Sample Receipt

Twenty animal tissue samples were received for analysis at ALS Environmental on 06/23/15. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored frozen at –20ºC upon receipt at the laboratory. One sample was canceled prior to analysis at the laboratory per client instruction.

Total Metals

No anomalies associated with the analysis of these samples were observed.

Approved by_____

Chain of Custody

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CHAIN OF CUSTODY

ALS Environmental

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SR# K1506755

PAGE 1 OF 1 COC#

PROJECT NAME: Tulsequah Chief Mine Water Quality & Aquatic Studies
PROJECT NUMBER:
PROJECT MANAGER: Jeckie, Timothy
COMPANY NAME: Alaska Dept. of Fish and Game Habitat
ADDRESS: 1108 F. St. Room 153
CITY/STATE/ZIP: Juneau AK 99801
E-MAIL ADDRESS: nicole.legere@alaska.gov
PHONE #: 907-465-6979 FAX #: 907-465-4759
SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐ SIM PAH☐	Volatile Organics 624☐ 8260☐ 8021☐ BTEX☐	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCBs Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081☐ 8141☐ 8151☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	Metals, Total or Dissolved (See List below)	Cyanide☐ Hex-Chrom☐	(circle) pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS, Turb.	(circle) NH_3-N, COD, TKN, TOC, DOC, NO_2+NO_3, T-Phos	TOX 9020☐ AOX 1650☐ 506☐	Alkalinity ☐ CO_3☐ HCO_3☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases RSK 175☐ Methane☐ Ethane☐ Ethene☐ CO_2☐				REMARKS
See list of juvenile fish whole body samples					19								X												

REPORT REQUIREMENTS

X I. Routine Report: Method Blank, Surrogate, as required

X II. Report Dup., MS, MSD as required

___ III. CLP Like Summary (no raw data)

___ IV. Data Validation Report

___ V. EDD

INVOICE INFORMATION

P.O. # 11-J-027-15

Bill To: PO Box 110024 Juneau, AK 99811-0024

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.

___ 5 day

X Standard (15 working days)

___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al (As) Sb Ba Be B Ca (Cd) Co Cr (Cu) Fe (Pb) Mg Mn Mo Ni K (Ag) Na (Se) Sr Tl Sn V (Zn) (Hg)

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: ___ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS: Dry weight basis, report % moisture. Process each sample bag as an individual test. Sample bags containing two fish process as a composite. Send a hard copy and e-copy to Nicole Legere PO Box 110024 Juneau, AK 99811-0024 nicole.legere@alaska.gov

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:		RECEIVED BY:		RELINQUISHED BY:		RECEIVED BY:	
Signature: [signature]	Date/Time: 6/22/15	Signature: [signature]	Date/Time: 6/23/15 0920	Signature:	Date/Time:	Signature:	Date/Time:
Printed Name: Nicole Legere	Firm: ADF&G	Printed Name: [signature]	Firm: ALS	Printed Name:	Firm:	Printed Name:	Firm:

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Tulsequah Chief Mine Water Quality and Aquatic Studies
Juvenile Fish for Whole Body Metals
Basis, all samples: Dry Weight, Report % Moisture
Requested Analysis: Ag,As,Cd,Cu,Hg,Pb,Se,Zn

K1506755

Matrix	Collector	Date Collected	Sample Number	Sample Location	Requested Analysis	FK Length (mm)	Weight (g)	Note
Whole Body	ADF&G	6/16/2015	061615UTRDVJ1	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	110	13.31	
Whole Body	ADF&G	6/16/2015	061615UTRDVJ2	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	95	8.7	
Whole Body	ADF&G	6/16/2015	061615UTRDVJ3	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	115	17.47	
Whole Body	ADF&G	6/16/2015	061615UTRDVJ4	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	113	13.73	
Whole Body	ADF&G	6/16/2015	061615UTRDVJ5	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	85	7.08	
Whole Body	ADF&G	6/16/2015	061615UTRDVJ6	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	83, 65	8.12	composite
Whole Body	ADF&G	6/16/2015	061615UTRDVJ7	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	80, 63	7.31	composite
Whole Body	ADF&G	6/16/2015	061615UTRDVJ8	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	70, 63	6.47	composite
Whole Body	ADF&G	6/16/2015	061615TRMDVJ1	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	105	12.48	
Whole Body	ADF&G	6/16/2015	061615TRMDVJ2	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	120	15.09	
Whole Body	ADF&G	6/16/2015	061615TRMDVJ3	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	100	10.17	
Whole Body	ADF&G	6/16/2015	061615TRMDVJ4	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	88	6.64	
Whole Body	ADF&G	6/16/2015	061615TRMDVJ5	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	90	6.93	
Whole Body	ADF&G	6/16/2015	061615TRMDVJ6	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	115	14.88	
Whole Body	ADF&G	6/16/2015	061615TRMDVJ7	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	90	8.77	
Whole Body	ADF&G	6/16/2015	061615TRMDVJ8	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	112	11.18	
Whole Body	ADF&G	6/16/2015	061615TRMDVJ9	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	105	11.78	
Whole Body	ADF&G	6/16/2015	061615TRMDVJ10	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	115	15.05	
Whole Body	ADF&G	6/16/2015	061615TRBDVJ1	Taku River Boundary	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	120	17.92	

PC Shari

Cooler Receipt and Preservation Form

Client / Project: ADF & 6 Service Request K15 06755

Received: 6/23/15 Opened: 6/23/15 By: [illegible] Unloaded: 6/23/15 By: [illegible]

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? 1 FRONT

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected. Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
0.8	0.5	FROZEN	—	-0.3	348		807957054114	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* _____
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: *RECEIVED 06/6/5TRMDUT11 NOT ON COC.

Page ____ *of* ____

Metals

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ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1506755
Project:	Tulsequah Chief Mine H20 Quality & Aquatic Studies	**Date Collected:**	06/16/15
Sample Matrix:	Animal Tissue	**Date Received:**	06/23/15
Analysis Method:	Calculation	**Units:**	Percent
Prep Method:	None	**Basis:**	Wet

Moisture

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
061615UTRDVJ1	K1506755-001	**80.7**	-	1	07/02/15 16:00	
061615UTRDVJ2	K1506755-002	**80.7**	-	1	07/02/15 16:00	
061615UTRDVJ3	K1506755-003	**80.8**	-	1	07/02/15 16:00	
061615UTRDVJ4	K1506755-004	**78.5**	-	1	07/02/15 16:00	
061615UTRDVJ5	K1506755-005	**79.3**	-	1	07/02/15 16:00	
061615UTRDVJ6	K1506755-006	**78.3**	-	1	07/02/15 16:00	
061615UTRDVJ7	K1506755-007	**79.7**	-	1	07/02/15 16:00	
061615UTRDVJ8	K1506755-008	**79.1**	-	1	07/02/15 16:00	
061615TRMDVJ1	K1506755-009	**77.8**	-	1	07/02/15 16:00	
061615TRMDVJ2	K1506755-010	**77.1**	-	1	07/02/15 16:00	
061615TRMDVJ3	K1506755-011	**76.0**	-	1	07/02/15 16:00	
061615TRMDVJ4	K1506755-012	**80.5**	-	1	07/02/15 16:00	
061615TRMDVJ5	K1506755-013	**83.9**	-	1	07/02/15 16:00	
061615TRMDVJ6	K1506755-014	**75.8**	-	1	07/02/15 16:00	
061615TRMDVJ7	K1506755-015	**76.0**	-	1	07/02/15 16:00	
061615TRMDVJ8	K1506755-016	**76.4**	-	1	07/02/15 16:00	
061615TRMDVJ9	K1506755-017	**77.7**	-	1	07/02/15 16:00	
061615TRMDVJ10	K1506755-018	**77.9**	-	1	07/02/15 16:00	
061615TRBDVJ1	K1506755-019	**79.0**	-	1	07/02/15 16:00	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1506755
Project:	Tulsequah Chief Mine H20 Quality & Aquatic Studies	**Date Collected:**	06/16/15
Sample Matrix:	Animal Tissue	**Date Received:**	06/23/15
Analysis Method:	Freeze Dry	**Units:**	Percent
Prep Method:	None	**Basis:**	Wet

Total Solids

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
061615UTRDVJ1	K1506755-001	**19.3**	-	1	07/02/15 16:00	
061615UTRDVJ2	K1506755-002	**19.3**	-	1	07/02/15 16:00	
061615UTRDVJ3	K1506755-003	**19.2**	-	1	07/02/15 16:00	
061615UTRDVJ4	K1506755-004	**21.5**	-	1	07/02/15 16:00	
061615UTRDVJ5	K1506755-005	**20.7**	-	1	07/02/15 16:00	
061615UTRDVJ6	K1506755-006	**21.7**	-	1	07/02/15 16:00	
061615UTRDVJ7	K1506755-007	**20.3**	-	1	07/02/15 16:00	
061615UTRDVJ8	K1506755-008	**20.9**	-	1	07/02/15 16:00	
061615TRMDVJ1	K1506755-009	**22.2**	-	1	07/02/15 16:00	
061615TRMDVJ2	K1506755-010	**22.9**	-	1	07/02/15 16:00	
061615TRMDVJ3	K1506755-011	**24.0**	-	1	07/02/15 16:00	
061615TRMDVJ4	K1506755-012	**19.5**	-	1	07/02/15 16:00	
061615TRMDVJ5	K1506755-013	**16.1**	-	1	07/02/15 16:00	
061615TRMDVJ6	K1506755-014	**24.2**	-	1	07/02/15 16:00	
061615TRMDVJ7	K1506755-015	**24.0**	-	1	07/02/15 16:00	
061615TRMDVJ8	K1506755-016	**23.6**	-	1	07/02/15 16:00	
061615TRMDVJ9	K1506755-017	**22.3**	-	1	07/02/15 16:00	
061615TRMDVJ10	K1506755-018	**22.1**	-	1	07/02/15 16:00	
061615TRBDVJ1	K1506755-019	**21.0**	-	1	07/02/15 16:00	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1506755
Project	Tulsequah Chief Mine H20 Quality & Aquatic Studies	**Date Collected:**	06/16/15
Sample Matrix:	Animal Tissue	**Date Received:**	06/23/15
		Date Analyzed:	07/02/15

Replicate Sample Summary
Inorganic Parameters

Sample Name:	061615TRBDVJ1	**Units:**	Percent
Lab Code:	K1506755-019	**Basis:**	Wet

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample K1506755-019DUP Result	Average	RPD	RPD Limit
Total Solids	Freeze Dry	-	21.0	21.4	21.2	2	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1506755
Project:	Tulsequah Chief Mine H20 Quality & Aquatic Studies	**Date Collected:**	06/16/15
Sample Matrix:	Animal tissue	**Date Received:**	06/23/15

Mercury, Total

Prep Method:	METHOD	Units:	ng/g
Analysis Method:	1631E	Basis:	Dry
Test Notes:			

Sample Name	Lab Code	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
061615UTRDVJ1	K1506755-001	5.0	5	07/11/15	07/13/15	39.0	
061615UTRDVJ2	K1506755-002	5.0	5	07/11/15	07/13/15	80.4	
061615UTRDVJ3	K1506755-003	5.0	5	07/11/15	07/13/15	55.8	
061615UTRDVJ4	K1506755-004	5.0	5	07/11/15	07/13/15	61.4	
061615UTRDVJ5	K1506755-005	5.0	5	07/11/15	07/13/15	22.2	
061615UTRDVJ6	K1506755-006	5.0	5	07/11/15	07/13/15	48.1	
061615UTRDVJ7	K1506755-007	5.0	5	07/11/15	07/13/15	45.6	
061615UTRDVJ8	K1506755-008	5.0	5	07/11/15	07/13/15	61.9	
061615TRMDVJ1	K1506755-009	5.0	5	07/11/15	07/13/15	30.7	
061615TRMDVJ2	K1506755-010	5.0	5	07/11/15	07/13/15	30.7	
061615TRMDVJ3	K1506755-011	5.0	5	07/11/15	07/13/15	30.7	
061615TRMDVJ4	K1506755-012	5.0	5	07/11/15	07/13/15	21.6	
061615TRMDVJ5	K1506755-013	5.0	5	07/11/15	07/13/15	39.0	
061615TRMDVJ6	K1506755-014	5.0	5	07/11/15	07/13/15	34.6	
061615TRMDVJ7	K1506755-015	5.0	5	07/11/15	07/13/15	25.2	
061615TRMDVJ8	K1506755-016	5.0	5	07/11/15	07/13/15	19.5	
061615TRMDVJ9	K1506755-017	5.0	5	07/11/15	07/13/15	33.6	
061615TRMDVJ10	K1506755-018	5.0	5	07/11/15	07/13/15	27.4	
061615TRBDVJ1	K1506755-019	5.0	5	07/11/15	07/13/15	44.7	
Method Blank 1	K1506755-MB1	1.0	1	07/11/15	07/13/15	ND	
Method Blank 2	K1506755-MB2	1.0	1	07/11/15	07/13/15	ND	
Method Blank 3	K1506755-MB3	1.0	1	07/11/15	07/13/15	ND	

ALS Group USA, Corp.
dba ALS Environmental
QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1506755
Project:	Tulsequah Chief Mine H20 Quality & Aquatic Studies	**Date Collected:**	06/16/15
Sample Matrix:	Animal tissue	**Date Received:**	06/23/15
		Date Extracted:	07/11/15
		Date Analyzed:	07/13/15

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name:	061615UTRDVJ3		Units:	ng/g
Lab Code:	K1506755-003MS,	K1506755-003MSD	Basis:	Dry
Test Notes:				

				Spike Level		Sample	Spike Result		Percent Recovery				
Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MS**	**DMS**	**Result**	**MS**	**DMS**	**MS**	**DMS**	**ALS Acceptance Limits**	**Relative Percent Difference**	**Result Notes**
Mercury	METHOD	1631E	5.0	247	247	55.8	281	282	91	92	70-130	<1	

ALS Group USA, Corp.
dba ALS Environmental
QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1506755
Project:	Tulsequah Chief Mine H20 Quality & Aquatic Studies	**Date Collected:**	06/16/15
Sample Matrix:	Animal tissue	**Date Received:**	06/23/15
		Date Extracted:	07/11/15
		Date Analyzed:	07/13/15

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name:	061615TRBDVJ1		Units:	ng/g
Lab Code:	K1506755-019MS,	K1506755-019MSD	Basis:	Dry
Test Notes:				

				Spike Level		Sample	Spike Result		Percent Recovery				
Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MS**	**DMS**	**Result**	**MS**	**DMS**	**MS**	**DMS**	**ALS Acceptance Limits**	**Relative Percent Difference**	**Result Notes**
Mercury	METHOD	1631E	5.0	249	249	44.7	282	270	95	90	70-130	4	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1506755
Project:	Tulsequah Chief Mine H20 Quality & Aquatic Studies	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	07/13/15

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Initial)

Units: ng/g
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	3.88	78	70-130	

ALS Group USA, Corp.
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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1506755
Project:	Tulsequah Chief Mine H20 Quality & Aquatic Studies	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	07/13/15

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Final)

Units: ng/g
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	3.89	78	70-130	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1506755
Project:	Tulsequah Chief Mine H20 Quality & Aquatic Studies	**Date Collected:**	NA
LCS Matrix:	Animal tissue	**Date Received:**	NA
		Date Extracted:	07/11/15
		Date Analyzed:	07/13/15

Quality Control Sample (QCS) Summary
Total Metals

Sample Name:	Quality Control Sample	Units:	ng/g
Lab Code:		Basis:	Dry
Test Notes:			

Source: TORT-3

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	292	231	79	70-130	

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615UTRDVJ1** **Lab Code:** **K1506755-001**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	0.6		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.18		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	36.0		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.19		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	2.2		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	130		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615UTRDVJ2** **Lab Code:** **K1506755-002**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	1.4		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.46		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	4.2		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.12		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	3.9		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	163		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615UTRDVJ3** **Lab Code:** **K1506755-003**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	0.7		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.12		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	4.0		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.11		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	3.2		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	144		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615UTRDVJ4** **Lab Code:** **K1506755-004**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	0.8		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.12		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	3.6		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.17		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	2.8		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	128		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615UTRDVJ5** **Lab Code:** **K1506755-005**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	0.6		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.12		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	3.5		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.51		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	3.3		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02		
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	165		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615UTRDVJ6** **Lab Code:** **K1506755-006**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	0.9		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.30		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	4.0		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.13		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	4.6		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	147		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615UTRDVJ7** **Lab Code:** **K1506755-007**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	1.0		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.10		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	2.7		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.08		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	3.5		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	124		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615UTRDVJ8** **Lab Code:** **K1506755-008**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	1.3		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.22		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	3.8		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.16		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	3.9		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	127		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615TRMDVJ1** **Lab Code:** **K1506755-009**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	0.5	U	
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.36		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	4.5		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.09		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	2.8		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	140		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615TRMDVJ2** **Lab Code:** **K1506755-010**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	0.5		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.30		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	5.3		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.06		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	3.3		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	159		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615TRMDVJ3** **Lab Code:** **K1506755-011**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	0.6		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.27		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	3.5		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.07		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	5.3		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	120		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615TRMDVJ4** **Lab Code:** **K1506755-012**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	0.6		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.13		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	3.3		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.03		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	6.8		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	137		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615TRMDVJ5** **Lab Code:** **K1506755-013**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	0.6		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.52		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	5.5		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.09		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	2.9		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	186		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615TRMDVJ6** **Lab Code:** **K1506755-014**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	1.5		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.37		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	8.2		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.54		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	3.8		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	119		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615TRMDVJ7** **Lab Code:** **K1506755-015**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	0.5		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.46		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	10.5		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.08		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	3.2		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	136		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615TRMDVJ8** **Lab Code:** **K1506755-016**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	0.5		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.26		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	4.0		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.05		
Selenium	6020A	0.9	5.0	07/09/15	07/13/15	2.6		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	124		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615TRMDVJ9** **Lab Code:** **K1506755-017**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	2.4		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.52		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	8.7		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.39		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	3.5		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02		
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	154		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615TRMDVJ10** **Lab Code:** **K1506755-018**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	1.3		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.59		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	7.5		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.33		
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	2.9		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	151		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	6/16/2015
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	6/23/2015
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **061615TRBDVJ1** **Lab Code:** **K1506755-019**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	1.3		
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.69		
Copper	6020A	0.1	5.0	07/09/15	07/13/15	3.7		
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.12		
Selenium	6020A	0.9	5.0	07/09/15	07/13/15	3.3		
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	159		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1506755
Project No.:	NA	**Date Collected:**	
Project Name:	Tulsequah Chief Mine H20 Qualit	**Date Received:**	
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **Method Blank** **Lab Code:** **KQ1507437-02**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	07/09/15	07/13/15	0.5	U	
Cadmium	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Copper	6020A	0.1	5.0	07/09/15	07/13/15	0.1	U	
Lead	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Selenium	6020A	1.0	5.0	07/09/15	07/13/15	1.0	U	
Silver	6020A	0.02	5.0	07/09/15	07/13/15	0.02	U	
Zinc	6020A	0.5	5.0	07/09/15	07/13/15	0.5	U	

Comments:

Metals
- 5A -
SPIKE SAMPLE RECOVERY

Client: Alaska Department of Fish and Ga **Service Request:** K1506755

Project No.: NA **Units:** MG/KG

Project Name: Tulsequah Chief Mine H20 Qualit **Basis:** DRY

Matrix: TISSUE

Sample Name: 061615UTRDVJ1S **Lab Code:** K1506755-001S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	75 - 125	20.0		0.6		16.5	117.6		6020A
Cadmium	75 - 125	5.16		0.17		4.95	100.8		6020A
Copper	75 - 125	60.0		36.0		24.8	96.8		6020A
Lead	75 - 125	46.07		0.19		49.50	92.7		6020A
Selenium	75 - 125	22.6		2.2		16.5	123.6		6020A
Silver	75 - 125	4.80		0.02	U	4.95	96.6		6020A
Zinc	75 - 125	187.2		129.8		49.5	116.0		6020A

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

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DUPLICATES

Client: Alaska Department of Fish and Ga **Service Request:** K1506755

Project No.: NA **Units:** MG/KG

Project Name: Tulsequah Chief Mine H20 Qualit **Basis:** DRY

Matrix: TISSUE

Sample Name: 061615UTRDVJ1D **Lab Code:** K1506755-001D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		0.6		0.8		28.6		6020A
Cadmium	20	0.17		0.14		19.4		6020A
Copper	20	36.0		38.3		6.2		6020A
Lead	20	0.19		0.22		14.6		6020A
Selenium		2.2		2.0		9.5		6020A
Silver		0.02	U	0.02	U			6020A
Zinc	20	129.8		132.8		2.3		6020A

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

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LABORATORY CONTROL SAMPLE

Client: Alaska Department of Fish and Ga **Service Request:** K1506755

Project No.: NA

Project Name: Tulsequah Chief Mine H20 Qualit

Aqueous LCS Source: ALS MIXED **Solid LCS Source:**

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits	%R
Arsenic	167.0	176.3	105.6					
Cadmium	50.0	50.0	100.0					
Copper	250.0	250.5	100.2					
Lead	500.0	496.8	99.4					
Selenium	167.0	188.6	112.9					
Silver	50.0	49.3	98.6					
Zinc	500.0	498.8	99.8					

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1506755
Project:	Tulsequah Chief Mine H2O Quality & Aquatic Studies	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	07/09/15
		Date Analyzed:	07/13/15

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1506755-SRM1	Basis:	Dry
Test Notes:	Dorm-4 Solids = 94.5%		

Source: N.R.C.C. Dorm-4

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	6020A	6.8	7.4	109	4.93-8.93	
Cadmium	PSEP Tissue	6020A	0.306	0.315	103	0.233 - 0.385	
Copper	PSEP Tissue	6020A	15.9	18.7	118	12.0 - 20.2	
Lead	PSEP Tissue	6020A	0.416	0.410	99	0.290 - 0.563	
Selenium	PSEP Tissue	6020A	3.56	4.29	121	2.58 - 4.68	
Zinc	PSEP Tissue	6020A	52.20	55.18	106	39.2 - 66.5	

ALS Group USA, Corp.
dba ALS Environmental
QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1506755
Project:	Tulsequah Chief Mine H2O Quality & Aquatic Studies	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	07/09/15
		Date Analyzed:	07/13/15

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1506755-SRM2	Basis:	Dry
Test Notes:	Tort-3 Solids = 99.1%		

Source: N.R.C.C. Tort-3

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	6020A	59.5	71.6	120	44.6-76.0	
Cadmium	PSEP Tissue	6020A	42.3	41.7	99	32.4-52.9	
Copper	PSEP Tissue	6020A	497	464	93	380-623	
Lead	PSEP Tissue	6020A	0.225	0.197	88	0.166-0.292	
Selenium	PSEP Tissue	6020A	10.9	13.2	121	7.9-14.3	
Zinc	PSEP Tissue	6020A	136	137	101	104-170	

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November 06, 2015

Analytical Report for Service Request No: K1510681

Nicole Legere
Alaska Department of Fish and Game
Division of Habitat/ Billy Ray Center
1008 F Street
P.O. Box 110024
Juneau, AK 99801

RE: Tulsequah Chief Mine Water Quality & Aquatic Study

Dear Nicole,

Enclosed are the results of the sample(s) submitted to our laboratory September 25, 2015
For your reference, these analyses have been assigned our service request number **K1510681.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3293. You may also contact me via email at Shar.Samy@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Shar Samy, Ph.D.
Project Manager

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
ISO 17025	http://www.pjlabs.com/	L14-50
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.

Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
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ALS ENVIRONMENTAL

Client:	Alaska Department of Fish and Game	**Service Request No.:**	K1510681
Project:	Tulsequah Chief Mine Water Quality & Aquatic Studies	**Date Received:**	09/25/15
Sample Matrix:	Animal Tissue		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), and Matrix/Duplicate Matrix Spike (MS/DMS).

Sample Receipt

Thirteen animal tissue samples were received for analysis at ALS Environmental on 09/25/15. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored frozen at –20ºC upon receipt at the laboratory.

Total Metals

Standard Reference Material Exceptions:
The recovery of Lead in the Standard Reference Material (SRM) N.R.C.C. Dorm-4 was below the normal ALS/Kelso control limit (i.e. 0.258 mg/kg versus a control limit of 0.290 mg/kg). The associated QA/QC results (e.g. SRM N.R.C.C. Tort-3, LCS, matrix spike, method blank, calibration standards, etc.) indicate the analysis was in control. No further corrective action was appropriate.

No other anomalies associated with the analysis of these samples were observed.

Approved by_____

Chain of Custody

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CHAIN OF CUSTODY

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SR# KI 510681

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PROJECT NAME: Tulsequah Chief Mine Water Quality + Aquatic Studies
PROJECT NUMBER:
PROJECT MANAGER: Jackie Timothy.
COMPANY NAME: Alaska Dept. of Fish + Game Habitat
ADDRESS: 802 3rd St. Room 123
CITY/STATE/ZIP: Douglas AK 99824
E-MAIL ADDRESS: nicole.legere@alaska.gov
PHONE #: 907-465-6979 FAX #: 907-465-4759
SAMPLER'S SIGNATURE: Nicole Legere

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐ SIM PAH☐	Volatile Organics 624☐ 8260☐ 8021☐ BTEX☐	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCBs Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081☐ 8141☐ 8151☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	Metals, Total or Dissolved (See List below)	Cyanide☐ Hex-Chrom☐	(circle) pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS, Turb.	(circle) NH_3-N, COD, TKN, TOC, DOC, NO_2+NO_3, T-Phos	TOX 9020☐ AOX 1650☐ 506☐	Alkalinity ☐ CO_3☐ HCO_3☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases RSK 175☐ Methane☐ Ethane☐ Ethene☐ CO_2☐				REMARKS
See list of fish whole samples	juvenile body				13								X											

REPORT REQUIREMENTS

- X I. Routine Report: Method Blank, Surrogate, as required
- X II. Report Dup., MS, MSD as required
- ___ III. CLP Like Summary (no raw data)
- ___ IV. Data Validation Report
- ___ V. EDD

INVOICE INFORMATION

P.O. # 11-J-027-15
Bill To: PO Box 110024 Juneau, AK 99811-0024

TURNAROUND REQUIREMENTS

- ___ 24 hr. ___ 48 hr.
- ___ 5 day
- X Standard (15 working days)
- ___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al (As) Sb Ba Be B Ca (Cd) Co Cr (Cu) Fe (Pb) Mg Mn Mo Ni K (Ag) Na (Se) Sr Tl Sn V (Zn) (Hg)

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: _____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS: Dry weight basis, report % moisture. Process each sample bag as an individual test. ~~Samples~~ Send a hard copy and e-copy to.
Nicole Legere
PO Box 110024
Juneau, AK 99811-0024
nicole.legere@alaska.gov

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Nicole Legere — Date/Time: 9/23, 2015	Signature: [illegible] — Date/Time: 9/25/15 0930	Signature: — Date/Time:	Signature: — Date/Time:
Printed Name: Nicole Legere — Firm: ADF+G	Printed Name: [illegible] — Firm: ALS	Printed Name: — Firm:	Printed Name: — Firm:

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K1510681

Tulsequah Chief Mine Water Quality and Aquatic Studies
Juvenile Fish for Whole Body Metals
Basis, all samples: Dry Weight, Report % Moisture
Requested Analysis: Ag,As,Cd,Cu,Hg,Pb,Se,Zn

Matrix	Collector	Date Collected	Sample Number	Sample Location	Requested Analysis	FK Length (mm)	Weight (g)	Note
Whole Body	ADF&G	9/3/2015	090315UTRDVJ1	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	97	7.95	
Whole Body	ADF&G	9/3/2015	090315UTRDVJ2	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	115	13.66	
Whole Body	ADF&G	9/3/2015	090315UTRDVJ3	Upper Tulsequah River	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	110	12.32	
Whole Body	ADF&G	9/3/2015	090315TRMDVJ1	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	128	18.25	
Whole Body	ADF&G	9/3/2015	090315TRMDVJ2	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	110	12.66	
Whole Body	ADF&G	9/3/2015	090315TRMDVJ3	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	125	17.25	
Whole Body	ADF&G	9/3/2015	090315TRMDVJ4	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	105	11.12	
Whole Body	ADF&G	9/3/2015	090315TRMDVJ5	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	132	20.53	
Whole Body	ADF&G	9/3/2015	090315TRMDVJ6	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	108	12.21	
Whole Body	ADF&G	9/3/2015	090315TRMDVJ7	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	102	10.44	
Whole Body	ADF&G	9/3/2015	090315TRMDVJ8	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	105	11.14	
Whole Body	ADF&G	9/3/2015	090315TRMDVJ9	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	100	9.16	
Whole Body	ADF&G	9/3/2015	090315TRMDVJ10	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	90	6.64	

PC Shar

Cooler Receipt and Preservation Form

Client / Project: Alaska DFG Service Request K15 10681

Received: 9/25/15 Opened: 9/25/15 By: L Unloaded: 9/25/15 By: AL

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? 1F 1B

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
0.7	0.9	N/P	—	0.2	352		808857482288	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* Paper
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

Page ____ *of* ____

Total Solids

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1510681
Project:	Tulsequah Chief Mine Water Quality & Aquatic Study	**Date Collected:**	09/3/15
Sample Matrix:	Animal Tissue	**Date Received:**	09/25/15
Analysis Method:	Calculation	**Units:**	Percent
Prep Method:	None	**Basis:**	Wet

Moisture

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
090315UTRDVJ1	K1510681-001	**77.9**	-	1	10/16/15 17:10	
090315UTRDVJ2	K1510681-002	**78.5**	-	1	10/16/15 17:10	
090315UTRDVJ3	K1510681-003	**78.1**	-	1	10/16/15 17:10	
090315TRMDVJ1	K1510681-004	**76.0**	-	1	10/16/15 17:10	
090315TRMDVJ2	K1510681-005	**78.6**	-	1	10/16/15 17:10	
090315TRMDVJ3	K1510681-006	**77.4**	-	1	10/16/15 17:10	
090315TRMDVJ4	K1510681-007	**78.8**	-	1	10/16/15 17:10	
090315TRMDVJ5	K1510681-008	**79.0**	-	1	10/16/15 17:10	
090315TRMDVJ6	K1510681-009	**77.1**	-	1	10/16/15 17:10	
090315TRMDVJ7	K1510681-010	**78.4**	-	1	10/16/15 17:10	
090315TRMDVJ8	K1510681-011	**77.5**	-	1	10/16/15 17:10	
090315TRMDVJ9	K1510681-012	**77.7**	-	1	10/16/15 17:10	
090315TRMDVJ10	K1510681-013	**79.5**	-	1	10/16/15 17:10	

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Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1510681
Project:	Tulsequah Chief Mine Water Quality & Aquatic Study	**Date Collected:**	09/3/15
Sample Matrix:	Animal Tissue	**Date Received:**	09/25/15
Analysis Method:	Freeze Dry	**Units:**	Percent
Prep Method:	None	**Basis:**	Wet

Total Solids

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
090315UTRDVJ1	K1510681-001	**22.1**	-	1	10/16/15 17:10	
090315UTRDVJ2	K1510681-002	**21.5**	-	1	10/16/15 17:10	
090315UTRDVJ3	K1510681-003	**21.9**	-	1	10/16/15 17:10	
090315TRMDVJ1	K1510681-004	**24.0**	-	1	10/16/15 17:10	
090315TRMDVJ2	K1510681-005	**21.4**	-	1	10/16/15 17:10	
090315TRMDVJ3	K1510681-006	**22.6**	-	1	10/16/15 17:10	
090315TRMDVJ4	K1510681-007	**21.2**	-	1	10/16/15 17:10	
090315TRMDVJ5	K1510681-008	**21.0**	-	1	10/16/15 17:10	
090315TRMDVJ6	K1510681-009	**22.9**	-	1	10/16/15 17:10	
090315TRMDVJ7	K1510681-010	**21.6**	-	1	10/16/15 17:10	
090315TRMDVJ8	K1510681-011	**22.5**	-	1	10/16/15 17:10	
090315TRMDVJ9	K1510681-012	**22.3**	-	1	10/16/15 17:10	
090315TRMDVJ10	K1510681-013	**20.5**	-	1	10/16/15 17:10	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1510681
Project	Tulsequah Chief Mine Water Quality & Aquatic Study	**Date Collected:**	09/03/15
Sample Matrix:	Animal Tissue	**Date Received:**	09/25/15
		Date Analyzed:	10/16/15

Replicate Sample Summary
Inorganic Parameters

Sample Name:	090315TRMDVJ5	**Units:**	Percent
Lab Code:	K1510681-008	**Basis:**	Wet

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample K1510681-008DUP Result	Average	RPD	RPD Limit
Total Solids	Freeze Dry	-	21.0	20.8	20.9	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Metals

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

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Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1510681
Project:	Tulsequah Chief Mine Water Quality & Aquatic Study	**Date Collected:**	09/03/15
Sample Matrix:	Animal tissue	**Date Received:**	09/25/15

Mercury, Total

Prep Method:	METHOD	Units:	ng/g
Analysis Method:	1631E	Basis:	Dry
Test Notes:			

Sample Name	Lab Code	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
090315UTRDVJ1	K1510681-001	4.8	5	10/27/15	10/29/15	32.3	
090315UTRDVJ2	K1510681-002	5.0	5	10/27/15	10/29/15	56.7	
090315UTRDVJ3	K1510681-003	4.8	5	10/27/15	10/29/15	58.0	
090315TRMDVJ1	K1510681-004	4.9	5	10/27/15	10/29/15	27.9	
090315TRMDVJ2	K1510681-005	4.7	5	10/27/15	10/29/15	49.8	
090315TRMDVJ3	K1510681-006	4.7	5	10/27/15	10/29/15	35.8	
090315TRMDVJ4	K1510681-007	4.9	5	10/27/15	10/29/15	54.0	
090315TRMDVJ5	K1510681-008	4.8	5	10/27/15	10/29/15	97.5	
090315TRMDVJ6	K1510681-009	4.8	5	10/27/15	10/29/15	35.3	
090315TRMDVJ7	K1510681-010	4.7	5	10/27/15	10/29/15	26.4	
090315TRMDVJ8	K1510681-011	4.8	5	10/27/15	10/29/15	48.1	
090315TRMDVJ9	K1510681-012	4.9	5	10/27/15	10/29/15	36.0	
090315TRMDVJ10	K1510681-013	4.7	5	10/27/15	10/29/15	75.8	
Method Blank 1	K1510681-MB1	1.0	1	10/27/15	10/29/15	ND	
Method Blank 2	K1510681-MB2	1.0	1	10/27/15	10/29/15	ND	
Method Blank 3	K1510681-MB3	1.0	1	10/27/15	10/29/15	ND	

ALS Group USA, Corp.
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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1510681
Project:	Tulsequah Chief Mine Water Quality & Aquatic Study	**Date Collected:**	09/03/15
Sample Matrix:	Animal tissue	**Date Received:**	09/25/15
		Date Extracted:	10/27/15
		Date Analyzed:	10/29/15

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name:	090315TRMDVJ5		Units:	ng/g
Lab Code:	K1510681-008MS,	K1510681-008MSD	Basis:	Dry
Test Notes:				

				Spike Level		Sample	Spike Result		Percent Recovery				
Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MS**	**DMS**	**Result**	**MS**	**DMS**	**MS**	**DMS**	**ALS Acceptance Limits**	**Relative Percent Difference**	**Result Notes**
Mercury	METHOD	1631E	4.7	236	235	97.5	308	330	89	99	70-130	7	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1510681
Project:	Tulsequah Chief Mine Water Quality & Aquatic Study	**Date Collected:**	NA
Sample Matrix:	Animal tissue	**Date Received:**	NA
		Date Extracted:	10/27/15
		Date Analyzed:	10/29/15

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name:	Batch QC		Units:	ng/g
Lab Code:	K1511011-004MS,	K1511011-004MSD	Basis:	Dry
Test Notes:				

				Spike Level		Sample	Spike Result		Percent Recovery				
Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MS**	**DMS**	**Result**	**MS**	**DMS**	**MS**	**DMS**	**ALS Acceptance Limits**	**Relative Percent Difference**	**Result Notes**
Mercury	METHOD	1631E	4.6	247	235	32.5	287	251	103	93	70-130	13	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1510681
Project:	Tulsequah Chief Mine Water Quality & Aquatic Study	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	10/29/15

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Initial)

Units: ng/g
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	5.38	108	70-130	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1510681
Project:	Tulsequah Chief Mine Water Quality & Aquatic Study	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	10/29/15

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Final)

Units: ng/g
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	5.53	111	70-130	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1510681
Project:	Tulsequah Chief Mine Water Quality & Aquatic Study	**Date Collected:**	NA
LCS Matrix:	Animal tissue	**Date Received:**	NA
		Date Extracted:	10/27/15
		Date Analyzed:	10/29/15

Quality Control Sample (QCS) Summary
Total Metals

Sample Name:	Quality Control Sample	Units:	ng/g
Lab Code:		Basis:	Dry
Test Notes:			

Source: TORT-3

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	292	261	89	70-130	

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	09/03/15
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	09/25/15
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **090315UTRDVJ1** **Lab Code:** **K1510681-001**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	10/26/15	10/29/15	0.5		
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.38		
Copper	200.8	0.1	5.0	10/26/15	10/29/15	3.0		
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.16		
Selenium	200.8	1.0	5.0	10/26/15	10/29/15	2.8		
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.02	U	
Zinc	200.8	0.5	5.0	10/26/15	10/29/15	156		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	09/03/15
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	09/25/15
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **090315UTRDVJ2** **Lab Code:** **K1510681-002**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	10/26/15	10/29/15	0.8		
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.28		
Copper	200.8	0.1	5.0	10/26/15	10/29/15	3.0		
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.13		
Selenium	200.8	1.0	5.0	10/26/15	10/29/15	3.5		
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.02	U	
Zinc	200.8	0.5	5.0	10/26/15	10/29/15	123		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	09/03/15
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	09/25/15
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **090315UTRDVJ3** **Lab Code:** **K1510681-003**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	10/26/15	10/29/15	0.6		
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.29		
Copper	200.8	0.1	5.0	10/26/15	10/29/15	2.6		
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.03		
Selenium	200.8	0.9	5.0	10/26/15	10/29/15	3.5		
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.10		
Zinc	200.8	0.5	5.0	10/26/15	10/29/15	138		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	09/03/15
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	09/25/15
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **090315TRMDVJ1** **Lab Code:** **K1510681-004**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	10/26/15	10/29/15	0.5	U	
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.19		
Copper	200.8	0.1	5.0	10/26/15	10/29/15	3.7		
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.11		
Selenium	200.8	1.0	5.0	10/26/15	10/29/15	3.5		
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.02	U	
Zinc	200.8	0.5	5.0	10/26/15	10/29/15	120		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	09/03/15
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	09/25/15
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **090315TRMDVJ2** **Lab Code:** **K1510681-005**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	10/26/15	10/29/15	0.5	U	
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.14		
Copper	200.8	0.1	5.0	10/26/15	10/29/15	3.4		
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.04		
Selenium	200.8	1.0	5.0	10/26/15	10/29/15	2.9		
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.02	U	
Zinc	200.8	0.5	5.0	10/26/15	10/29/15	121		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	09/03/15
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	09/25/15
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **090315TRMDVJ3** **Lab Code:** **K1510681-006**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	10/26/15	10/29/15	0.6		
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.20		
Copper	200.8	0.1	5.0	10/26/15	10/29/15	3.2		
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.12		
Selenium	200.8	0.9	5.0	10/26/15	10/29/15	3.0		
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.02	U	
Zinc	200.8	0.5	5.0	10/26/15	10/29/15	117		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	09/03/15
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	09/25/15
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **090315TRMDVJ4** **Lab Code:** **K1510681-007**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	10/26/15	10/29/15	0.8		
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.22		
Copper	200.8	0.1	5.0	10/26/15	10/29/15	3.4		
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.06		
Selenium	200.8	0.9	5.0	10/26/15	10/29/15	2.4		
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.04		
Zinc	200.8	0.5	5.0	10/26/15	10/29/15	155		

Comments:

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	09/03/15
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	09/25/15
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **090315TRMDVJ5** **Lab Code:** **K1510681-008**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	10/26/15	10/29/15	0.5		
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.18		
Copper	200.8	0.1	5.0	10/26/15	10/29/15	3.4		
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.07		
Selenium	200.8	1.0	5.0	10/26/15	10/29/15	2.0		
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.03		
Zinc	200.8	0.5	5.0	10/26/15	10/29/15	138		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	09/03/15
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	09/25/15
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **090315TRMDVJ6** **Lab Code:** **K1510681-009**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.4	5.0	10/26/15	10/29/15	1.1		
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.44		
Copper	200.8	0.1	5.0	10/26/15	10/29/15	3.7		
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.12		
Selenium	200.8	0.9	5.0	10/26/15	10/29/15	2.6		
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.02	U	
Zinc	200.8	0.4	5.0	10/26/15	10/29/15	142		

Comments:

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	09/03/15
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	09/25/15
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **090315TRMDVJ7** **Lab Code:** **K1510681-010**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	10/26/15	10/29/15	0.7		
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.45		
Copper	200.8	0.1	5.0	10/26/15	10/29/15	4.0		
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.15		
Selenium	200.8	1.0	5.0	10/26/15	10/29/15	2.8		
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.02	U	
Zinc	200.8	0.5	5.0	10/26/15	10/29/15	130		

Comments:

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	09/03/15
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	09/25/15
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **090315TRMDVJ8** **Lab Code:** **K1510681-011**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	10/26/15	10/29/15	0.5	U	
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.40		
Copper	200.8	0.1	5.0	10/26/15	10/29/15	3.4		
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.07		
Selenium	200.8	1.0	5.0	10/26/15	10/29/15	2.9		
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.03		
Zinc	200.8	0.5	5.0	10/26/15	10/29/15	130		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	09/03/15
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	09/25/15
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **090315TRMDVJ9** **Lab Code:** **K1510681-012**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	10/26/15	10/29/15	0.5	U	
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.16		
Copper	200.8	0.1	5.0	10/26/15	10/29/15	2.9		
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.06		
Selenium	200.8	1.0	5.0	10/26/15	10/29/15	2.5		
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.02	U	
Zinc	200.8	0.5	5.0	10/26/15	10/29/15	136		

Comments:

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	09/03/15
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	09/25/15
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **090315TRMDVJ10** **Lab Code:** **K1510681-013**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	10/26/15	10/29/15	0.5		
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.15		
Copper	200.8	0.1	5.0	10/26/15	10/29/15	3.0		
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.07		
Selenium	200.8	1.0	5.0	10/26/15	10/29/15	2.9		
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.02	U	
Zinc	200.8	0.5	5.0	10/26/15	10/29/15	125		

Comments:

Metals

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INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1510681
Project No.:	NA	**Date Collected:**	
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **Method Blank** **Lab Code:** **KQ1512390-01**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	200.8	0.5	5.0	10/26/15	10/29/15	0.5	U	
Cadmium	200.8	0.02	5.0	10/26/15	10/29/15	0.02	U	
Copper	200.8	0.1	5.0	10/26/15	10/29/15	0.1	U	
Lead	200.8	0.02	5.0	10/26/15	10/30/15	0.02	U	
Selenium	200.8	1.0	5.0	10/26/15	10/29/15	1.0	U	
Silver	200.8	0.02	5.0	10/26/15	10/29/15	0.02	U	
Zinc	200.8	0.5	5.0	10/26/15	10/29/15	0.5	U	

Comments:

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SPIKE SAMPLE RECOVERY

Client: Alaska Department of Fish and Ga **Service Request:** K1510681

Project No.: NA **Units:** MG/KG

Project Name: Tulsequah Chief Mine Water Quali **Basis:** DRY

Matrix: TISSUE

Sample Name: 090315UTRDVJ2S **Lab Code:** K1510681-002S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	70 - 130	18.5		0.8		16.5	107.3		200.8
Cadmium	70 - 130	5.28		0.28		4.95	101.0		200.8
Copper	70 - 130	25.7		3.0		24.8	91.5		200.8
Lead	70 - 130	46.60		0.13		49.50	93.9		200.8
Selenium	70 - 130	21.9		3.5		16.5	111.5		200.8
Silver	70 - 130	4.50		0.02	U	4.95	90.9		200.8
Zinc	70 - 130	165.9		122.5		49.5	87.7		200.8

An empty field in the Control Limit column indicates the control limit is not applicable

Metals
- 5A -
SPIKE SAMPLE RECOVERY

Client: Alaska Department of Fish and Ga **Service Request:** K1510681

Project No.: NA **Units:** MG/KG

Project Name: Tulsequah Chief Mine Water Quali **Basis:** DRY

Matrix: TISSUE

Sample Name: 090315TRMDVJ5S **Lab Code:** K1510681-008S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	70 - 130	17.0		0.5		15.9	103.8		200.8
Cadmium	70 - 130	4.99		0.18		4.75	101.3		200.8
Copper	70 - 130	24.6		3.4		23.7	89.5		200.8
Lead	70 - 130	43.70		0.07		47.47	91.9		200.8
Selenium	70 - 130	19.6		2.0		15.9	110.7		200.8
Silver	70 - 130	4.26		0.03		4.75	89.1		200.8
Zinc	70 - 130	184.9		138.0		47.5	98.7		200.8

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

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DUPLICATES

Client: Alaska Department of Fish and Ga **Service Request:** K1510681

Project No.: NA **Units:** MG/KG

Project Name: Tulsequah Chief Mine Water Quali **Basis:** DRY

Matrix: TISSUE

Sample Name: 090315UTRDVJ2D **Lab Code:** K1510681-002D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		0.8		0.7		13.3		200.8
Cadmium	30	0.28		0.25		11.3		200.8
Copper	30	3.0		2.8		6.9		200.8
Lead	30	0.13		0.11		16.7		200.8
Selenium		3.5		3.2		9.0		200.8
Silver		0.02	U	0.02	U			200.8
Zinc	30	122.5		117.1		4.5		200.8

An empty field in the Control Limit column indicates the control limit is not applicable.

Form VI - IN

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DUPLICATES

Client: Alaska Department of Fish and Ga **Service Request:** K1510681

Project No.: NA **Units:** MG/KG

Project Name: Tulsequah Chief Mine Water Quali **Basis:** DRY

Matrix: TISSUE

Sample Name: 090315TRMDVJ5D **Lab Code:** K1510681-008D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		0.5		0.5		0.0		200.8
Cadmium	30	0.18		0.18		0.0		200.8
Copper	30	3.4		3.5		2.9		200.8
Lead		0.07		0.06		15.4		200.8
Selenium		2.0		2.1		4.9		200.8
Silver		0.03		0.03		0.0		200.8
Zinc	30	138.0		144.7		4.7		200.8

An empty field in the Control Limit column indicates the control limit is not applicable.

Form VI - IN

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LABORATORY CONTROL SAMPLE

Client: Alaska Department of Fish and Ga **Service Request:** K1510681

Project No.: NA

Project Name: Tulsequah Chief Mine Water Quali

Aqueous LCS Source: ALS MIXED **Solid LCS Source:**

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits	%R
Arsenic	167.0	160.5	96.1					
Cadmium	50.0	49.5	99.0					
Copper	250.0	233.3	93.3					
Lead	500.0	483.0	96.6					
Selenium	167.0	171.1	102.5					
Silver	50.0	47.1	94.2					
Zinc	500.0	473.2	94.6					

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1510681
Project:	Tulsequah Chief Mine Water Quality & Aquatic Study	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	10/26/15
		Date Analyzed:	10/29,30/15

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1510681-SRM1	Basis:	Dry
Test Notes:	Dorm-4 Solids = 94.5%		

Source: N.R.C.C. Dorm-4

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	200.8	6.8	6.86	101	4.93-8.93	
Cadmium	PSEP Tissue	200.8	0.306	0.300	98	0.233 - 0.385	
Copper	PSEP Tissue	200.8	15.9	14.6	92	12.0 - 20.2	
Lead	PSEP Tissue	200.8	0.416	0.258	62	0.290 - 0.563	X
Selenium	PSEP Tissue	200.8	3.56	3.84	108	2.58 - 4.68	
Zinc	PSEP Tissue	200.8	52.20	50.6	97	39.2 - 66.5	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1510681
Project:	Tulsequah Chief Mine Water Quality & Aquatic Study	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	10/26/15
		Date Analyzed:	10/29,30/15

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1510681-SRM1	Basis:	Dry
Test Notes:	Tort-3 Solids = 99.1%		

Source: N.R.C.C. Tort-3

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	200.8	59.5	63.7	107	44.6-76.0	
Cadmium	PSEP Tissue	200.8	42.3	40.0	95	32.4-52.9	
Copper	PSEP Tissue	200.8	497	412	83	380-623	
Lead	PSEP Tissue	200.8	0.225	0.178	79	0.166-0.292	
Selenium	PSEP Tissue	200.8	10.9	11.7	107	7.9-14.3	
Zinc	PSEP Tissue	200.8	136	127	93	104-170	

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June 13, 2016

Analytical Report for Service Request No: K1604486
Revised Service Request No: K1604486.01

Nicole Legere
Alaska Department of Fish and Game
802 3rd St.,
P.O. Box 110024
Juneau, AK 99811-0024

RE: Tulsequah Chief Mine Water Quality & Aquatic Studies / 160004158

Dear Nicole,

Enclosed is the revised report for the sample(s) submitted to our laboratory April 28, 2016
For your reference, these analyses have been assigned our service request number **K1604486.**

The client sample IDs for K1604486-001 and K1604486-002 have been revised.

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3293. You may also contact me via email at Shar.Samy@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Shar Samy, Ph.D.
Project Manager

REVISED
2:23 pm, Jun 10, 2016

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Chain of Custody

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SR# K1604486

PAGE 1 OF 1 COC#

PROJECT NAME: Tulsequah Chief Mine Water Quality + Aquatic Studies
PROJECT NUMBER:
PROJECT MANAGER: Jackie Timothy
COMPANY NAME: Alaska Dept of Fish and Game Habitat
ADDRESS: 802 3rd St.
CITY/STATE/ZIP: Douglas, AK 99824
E-MAIL ADDRESS: nicole.legere@alaska.gov
PHONE #: 907-465-6979 FAX #: 907-465-4759
SAMPLER'S SIGNATURE: Nicole Legere

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	Semivolatile Organics by GC/MS 625☐ 8270☐ 8270LL☐ SIM PAH☐	Volatile Organics 624☐ 8260☐ 8021☐ BTEX☐	Hydrocarbons (*see below) Gas☐ Diesel☐ Oil☐	Oil & Grease/TRPH 1664 HEM☐ 1664 SGT☐	PCBs Aroclors☐ Congeners☐	Pesticides/Herbicides 608☐ 8081☐ 8141☐ 8151☐	Chlorophenolics - 8151M Tri☐ Tetra☐ PCP☐	Metals, Total or Dissolved (See List below)	Cyanide☐ Hex-Chrom☐	(circle) pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS, Turb.	(circle) NH_3-N, COD, TKN, TOC, DOC, NO_2+NO_3, T-Phos	TOX 9020☐ AOX 1650☐ 506☐	Alkalinity☐ CO_3☐ HCO_3☐	Dioxins/Furans 1613☐ 8290☐	Dissolved Gases RSK 175☐ Methane☐ Ethane☐ Ethene☐ CO_2☐				REMARKS
See list of					11								X												
juvenile																									
fish whole																									
body samples																									

REPORT REQUIREMENTS

- X I. Routine Report: Method Blank, Surrogate, as required
- X II. Report Dup., MS, MSD as required
- ___ III. CLP Like Summary (no raw data)
- ___ IV. Data Validation Report
- ___ V. EDD

INVOICE INFORMATION

P.O. # 11-J-027-15
Bill To: PO Box 110024 Juneau, AK 99811-0024

TURNAROUND REQUIREMENTS

- ___ 24 hr. ___ 48 hr.
- ___ 5 day
- X Standard (15 working days)
- ___ Provide FAX Results

Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al (As) Sb Ba Be B Ca (Cd) Co Cr (Cu) Fe (Pb) Mg Mn Mo Ni K (Ag) Na (Se) Sr Tl Sn V (Zn) (Hg)

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER: ___ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS: Dry weight basis, report % moisture. Process each sample bag as an individual test. Send a hard copy and an e-copy to:
Nicole Legere
PO Box 110024
Juneau, AK 99811-0024
nicole.legere@alaska.gov

☐ Sample Shipment contains USDA regulated soil samples (check box if applicable)

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Nicole Legere	Signature: [illegible]	Signature:	Signature:
Date/Time: 4/28/16	Date/Time: 4/28/16 0940	Date/Time:	Date/Time:
Printed Name: Nicole Legere	Printed Name: [illegible]	Printed Name:	Printed Name:
Firm: ADF&G	Firm: ALS	Firm:	Firm:

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Tulsequah Chief Mine Water Quality and Aquatic Studies
Juvenile Fish for Whole Body Metals
Basis, all samples: Dry Weight, Report % Moisture
Requested Analysis: Ag,As,Cd,Cu,Hg,Pb,Se,Zn

Matrix	Collector	Date Collected	Sample Number	Sample Location	Requested Analysis	FK Length (mm)	Weight (g)
Whole Body	ADF&G	4/24/2016	042416TRMDVJ1	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	80	5.59
Whole Body	ADF&G	4/24/2016	042416TRMDVJ2	Tulsequah River Mine Site	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	85	6.62
Whole Body	ADF&G	4/24/2016	042416TRBDVJ1	Taku River Border	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	100	9.13
Whole Body	ADF&G	4/24/2016	042416TRBDVJ2	Taku River Border	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	155	33.1
Whole Body	ADF&G	4/24/2016	042416TRBDVJ3	Taku River Border	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	155	30.55
Whole Body	ADF&G	4/24/2016	042416TRBDVJ4	Taku River Border	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	130	21.39
Whole Body	ADF&G	4/24/2016	042416TRBDVJ5	Taku River Border	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	120	15.9
Whole Body	ADF&G	4/24/2016	042416TRBDVJ6	Taku River Border	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	110	14.13
Whole Body	ADF&G	4/24/2016	042416TRBDVJ7	Taku River Border	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	95	9.88
Whole Body	ADF&G	4/24/2016	042416TRBDVJ8	Taku River Border	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	95	9.79
Whole Body	ADF&G	4/24/2016	042416TRBDVJ9	Taku River Border	Ag,As,Cd,Cu,Hg,Pb,Se,Zn	70	3.83

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3:22 pm, Jun 10, 2016

PC Shar

Cooler Receipt and Preservation Form

Client AK Dept of Fish & WL Service Request K16 04486

Received: 4/28/16 Opened: 4/28/16 By: Unloaded: 4/28/16 By:

1. Samples were received via? *Mail* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* NA
3. Were custody seals on coolers? NA Y N If yes, how many and where? one, front
   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
-0.8	-0.5	frozen →		40.3	352		7829 2081 8032	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* paper
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA Y N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:
042416TRMDVJ1	042416UTRDVJ1	elimination
" 2	" 2	"

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions:

Page ____ ***of*** ____

Total Solids

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2:24 pm, Jun 10, 2016

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Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1604486
Project:	Tulsequah Chief Mine Water Quality & Aquatic Studi/160004158	**Date Collected:**	04/24/16
Sample Matrix:	Animal Tissue	**Date Received:**	04/28/16
Analysis Method:	Calculation	**Units:**	Percent
Prep Method:	None	**Basis:**	Wet

Moisture

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
042416TRMDVJ1	K1604486-001	**78.1**	-	1	05/06/16 14:45	
042416TRMDVJ2	K1604486-002	**77.1**	-	1	05/06/16 14:45	
042416TRBDVJ1	K1604486-003	**80.3**	-	1	05/06/16 14:45	
042416TRBDVJ2	K1604486-004	**75.6**	-	1	05/06/16 14:45	
042416TRBDVJ3	K1604486-005	**78.4**	-	1	05/06/16 14:45	
042416TRBDVJ4	K1604486-006	**78.8**	-	1	05/06/16 14:45	
042416TRBDVJ5	K1604486-007	**78.6**	-	1	05/06/16 14:45	
042416TRBDVJ6	K1604486-008	**77.4**	-	1	05/06/16 14:45	
042416TRBDVJ7	K1604486-009	**77.3**	-	1	05/06/16 14:45	
042416TRBDVJ8	K1604486-010	**79.6**	-	1	05/06/16 14:45	
042416TRBDVJ9	K1604486-011	**73.3**	-	1	05/06/16 14:45	

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Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1604486
Project:	Tulsequah Chief Mine Water Quality & Aquatic Studi/160004158	**Date Collected:**	04/24/16
Sample Matrix:	Animal Tissue	**Date Received:**	04/28/16
Analysis Method:	Freeze Dry	**Units:**	Percent
Prep Method:	None	**Basis:**	Wet

Total Solids

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
042416TRMDVJ1	K1604486-001	**21.9**	-	1	05/06/16 14:45	
042416TRMDVJ2	K1604486-002	**22.9**	-	1	05/06/16 14:45	
042416TRBDVJ1	K1604486-003	**19.7**	-	1	05/06/16 14:45	
042416TRBDVJ2	K1604486-004	**24.4**	-	1	05/06/16 14:45	
042416TRBDVJ3	K1604486-005	**21.6**	-	1	05/06/16 14:45	
042416TRBDVJ4	K1604486-006	**21.2**	-	1	05/06/16 14:45	
042416TRBDVJ5	K1604486-007	**21.4**	-	1	05/06/16 14:45	
042416TRBDVJ6	K1604486-008	**22.6**	-	1	05/06/16 14:45	
042416TRBDVJ7	K1604486-009	**22.7**	-	1	05/06/16 14:45	
042416TRBDVJ8	K1604486-010	**20.4**	-	1	05/06/16 14:45	
042416TRBDVJ9	K1604486-011	**26.7**	-	1	05/06/16 14:45	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1604486
Project	Tulsequah Chief Mine Water Quality & Aquatic Studi/160004158	**Date Collected:**	04/24/16
Sample Matrix:	Animal Tissue	**Date Received:**	04/28/16
		Date Analyzed:	05/06/16

Replicate Sample Summary
Inorganic Parameters

Sample Name:	042416TRBDVJ2	**Units:**	Percent
Lab Code:	K1604486-004	**Basis:**	Wet

Analyte Name	Analysis Method	MRL	Sample Result	Duplicate Sample K1604486-004DUP Result	Average	RPD	RPD Limit
Total Solids	Freeze Dry	-	24.4	23.2	23.8	5	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Metals

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Analytical Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1604486
Project:	Tulsequah Chief Mine Water Quality & Aquatic Studi/160004158	**Date Collected:**	04/24/16
Sample Matrix:	Animal tissue	**Date Received:**	04/28/16

Mercury, Total

Prep Method:	METHOD	Units:	ng/g
Analysis Method:	1631E	Basis:	Dry
Test Notes:			

Sample Name	Lab Code	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
042416TRMDVJ1	K1604486-001	5.0	5	05/18/16	05/19/16	41.3	
042416TRMDVJ2	K1604486-002	1.0	1	05/18/16	05/19/16	12.5	
042416TRBDVJ1	K1604486-003	4.9	5	05/18/16	05/19/16	37.2	
042416TRBDVJ2	K1604486-004	4.9	5	05/18/16	05/19/16	97.5	
042416TRBDVJ3	K1604486-005	4.8	5	05/18/16	05/19/16	53.0	
042416TRBDVJ4	K1604486-006	4.8	5	05/18/16	05/19/16	33.2	
042416TRBDVJ5	K1604486-007	4.9	5	05/18/16	05/19/16	133	
042416TRBDVJ6	K1604486-008	4.8	5	05/18/16	05/19/16	117	
042416TRBDVJ7	K1604486-009	4.7	5	05/18/16	05/19/16	56.6	
042416TRBDVJ8	K1604486-010	4.9	5	05/18/16	05/19/16	34.4	
042416TRBDVJ9	K1604486-011	1.0	1	05/18/16	05/19/16	14.6	
Method Blank 1	K1604486-MB1	1.0	1	05/18/16	05/19/16	ND	
Method Blank 2	K1604486-MB2	1.0	1	05/18/16	05/19/16	ND	
Method Blank 3	K1604486-MB3	1.0	1	05/18/16	05/19/16	ND	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1604486
Project:	Tulsequah Chief Mine Water Quality & Aquatic Studi/160004158	**Date Collected:**	04/24/16
Sample Matrix:	Animal tissue	**Date Received:**	04/28/16
		Date Extracted:	05/18/16
		Date Analyzed:	05/19/16

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name:	042416TRBDVJ2		Units:	ng/g
Lab Code:	K1604486-004MS,	K1604486-004MSD	Basis:	Dry
Test Notes:				

				Spike Level		Sample	Spike Result		Percent Recovery				
Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MS**	**DMS**	**Result**	**MS**	**DMS**	**MS**	**DMS**	**ALS Acceptance Limits**	**Relative Percent Difference**	**Result Notes**
Mercury	METHOD	1631E	4.9	240	244	97.5	325	326	95	94	70-130	<1	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1604486
Project:	Tulsequah Chief Mine Water Quality & Aquatic Studi/160004158	**Date Collected:**	04/24/16
Sample Matrix:	Animal tissue	**Date Received:**	04/28/16
		Date Extracted:	05/18/16
		Date Analyzed:	05/19/16

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name:	042416TRBDVJ4		Units:	ng/g
Lab Code:	K1604486-006MS,	K1604486-006MSD	Basis:	Dry
Test Notes:				

				Spike Level		Sample	Spike Result		Percent Recovery				
Analyte	**Prep Method**	**Analysis Method**	**MRL**	**MS**	**DMS**	**Result**	**MS**	**DMS**	**MS**	**DMS**	**ALS Acceptance Limits**	**Relative Percent Difference**	**Result Notes**
Mercury	METHOD	1631E	5.0	241	248	33.2	270	274	98	97	70-130	1	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1604486
Project:	Tulsequah Chief Mine Water Quality & Aquatic Studi/160004158	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	05/19/16

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Initial)

Units: ng/g
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	5.28	106	70-130	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1604486
Project:	Tulsequah Chief Mine Water Quality & Aquatic Studi/160004158	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	NA
		Date Analyzed:	05/19/16

Ongoing Precision and Recovery (OPR) Sample Summary
Total Metals

Sample Name: Ongoing Precision and Recovery (Final)

Units: ng/g
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	4.83	97	70-130	

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QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1604486
Project:	Tulsequah Chief Mine Water Quality & Aquatic Studi/160004158	**Date Collected:**	NA
LCS Matrix:	Animal tissue	**Date Received:**	NA
		Date Extracted:	05/18/16
		Date Analyzed:	05/19/16

Quality Control Sample (QCS) Summary
Total Metals

Sample Name:	Quality Control Sample	Units:	ng/g
Lab Code:		Basis:	Dry
Test Notes:			

Source: TORT-3

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	ALS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	292	268	92	70-130	

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1604486
Project No.:	160004158	**Date Collected:**	4/24/2016
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	4/28/2016
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **042416TRMDVJ1** **Lab Code:** **K1604486-001**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	05/10/16	05/25/16	2.4		
Cadmium	6020A	0.02	5.0	05/10/16	05/25/16	0.30		
Copper	6020A	0.1	5.0	05/10/16	05/25/16	12.4		
Lead	6020A	0.02	5.0	05/10/16	05/25/16	0.21		
Selenium	6020A	1.0	5.0	05/10/16	05/25/16	3.3		
Silver	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Zinc	6020A	0.5	5.0	05/10/16	05/25/16	176		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1604486
Project No.:	160004158	**Date Collected:**	4/24/2016
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	4/28/2016
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **042416TRMDVJ2** **Lab Code:** **K1604486-002**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	05/10/16	05/25/16	0.5	U	
Cadmium	6020A	0.02	5.0	05/10/16	05/25/16	0.14		
Copper	6020A	0.1	5.0	05/10/16	05/25/16	4.3		
Lead	6020A	0.02	5.0	05/10/16	05/25/16	0.23		
Selenium	6020A	0.9	5.0	05/10/16	05/25/16	3.1		
Silver	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Zinc	6020A	0.5	5.0	05/10/16	05/25/16	136		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1604486
Project No.:	160004158	**Date Collected:**	4/24/2016
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	4/28/2016
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **042416TRBDVJ1** **Lab Code:** **K1604486-003**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	05/10/16	05/25/16	0.6		
Cadmium	6020A	0.02	5.0	05/10/16	05/25/16	0.28		
Copper	6020A	0.1	5.0	05/10/16	05/25/16	5.2		
Lead	6020A	0.02	5.0	05/10/16	05/25/16	0.27		
Selenium	6020A	1.0	5.0	05/10/16	05/25/16	3.5		
Silver	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Zinc	6020A	0.5	5.0	05/10/16	05/25/16	173		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1604486
Project No.:	160004158	**Date Collected:**	4/24/2016
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	4/28/2016
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **042416TRBDVJ2** **Lab Code:** **K1604486-004**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	05/10/16	05/25/16	0.5	U	
Cadmium	6020A	0.02	5.0	05/10/16	05/25/16	0.06		
Copper	6020A	0.1	5.0	05/10/16	05/25/16	2.3		
Lead	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Selenium	6020A	1.0	5.0	05/10/16	05/25/16	3.9		
Silver	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Zinc	6020A	0.5	5.0	05/10/16	05/25/16	120		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1604486
Project No.:	160004158	**Date Collected:**	4/24/2016
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	4/28/2016
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **042416TRBDVJ3** **Lab Code:** **K1604486-005**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	05/10/16	05/25/16	0.5		
Cadmium	6020A	0.02	5.0	05/10/16	05/25/16	0.10		
Copper	6020A	0.1	5.0	05/10/16	05/25/16	3.1		
Lead	6020A	0.02	5.0	05/10/16	05/25/16	0.02		
Selenium	6020A	0.9	5.0	05/10/16	05/25/16	2.3		
Silver	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Zinc	6020A	0.5	5.0	05/10/16	05/25/16	134		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1604486
Project No.:	160004158	**Date Collected:**	4/24/2016
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	4/28/2016
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **042416TRBDVJ4** **Lab Code:** **K1604486-006**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	05/10/16	05/25/16	1.4		
Cadmium	6020A	0.02	5.0	05/10/16	05/25/16	0.25		
Copper	6020A	0.1	5.0	05/10/16	05/25/16	5.0		
Lead	6020A	0.02	5.0	05/10/16	05/25/16	0.06		
Selenium	6020A	1.0	5.0	05/10/16	05/25/16	2.4		
Silver	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Zinc	6020A	0.5	5.0	05/10/16	05/25/16	174		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1604486
Project No.:	160004158	**Date Collected:**	4/24/2016
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	4/28/2016
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **042416TRBDVJ5** **Lab Code:** **K1604486-007**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	05/10/16	05/25/16	1.3		
Cadmium	6020A	0.02	5.0	05/10/16	05/25/16	0.33		
Copper	6020A	0.1	5.0	05/10/16	05/25/16	5.4		
Lead	6020A	0.02	5.0	05/10/16	05/25/16	0.22		
Selenium	6020A	1.0	5.0	05/10/16	05/25/16	2.1		
Silver	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Zinc	6020A	0.5	5.0	05/10/16	05/25/16	147		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1604486
Project No.:	160004158	**Date Collected:**	4/24/2016
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	4/28/2016
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **042416TRBDVJ6** **Lab Code:** **K1604486-008**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	05/10/16	05/25/16	0.5		
Cadmium	6020A	0.02	5.0	05/10/16	05/25/16	0.29		
Copper	6020A	0.1	5.0	05/10/16	05/25/16	3.2		
Lead	6020A	0.02	5.0	05/10/16	05/25/16	0.11		
Selenium	6020A	0.9	5.0	05/10/16	05/25/16	3.5		
Silver	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Zinc	6020A	0.5	5.0	05/10/16	05/25/16	119		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1604486
Project No.:	160004158	**Date Collected:**	4/24/2016
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	4/28/2016
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **042416TRBDVJ7** **Lab Code:** **K1604486-009**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	05/10/16	05/25/16	1.1		
Cadmium	6020A	0.02	5.0	05/10/16	05/25/16	0.31		
Copper	6020A	0.1	5.0	05/10/16	05/25/16	5.0		
Lead	6020A	0.02	5.0	05/10/16	05/25/16	0.12		
Selenium	6020A	1.0	5.0	05/10/16	05/25/16	3.0		
Silver	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Zinc	6020A	0.5	5.0	05/10/16	05/25/16	179		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1604486
Project No.:	160004158	**Date Collected:**	4/24/2016
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	4/28/2016
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **042416TRBDVJ8** **Lab Code:** **K1604486-010**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	05/10/16	05/25/16	0.5	U	
Cadmium	6020A	0.02	5.0	05/10/16	05/25/16	0.17		
Copper	6020A	0.1	5.0	05/10/16	05/25/16	3.7		
Lead	6020A	0.02	5.0	05/10/16	05/25/16	0.02		
Selenium	6020A	1.0	5.0	05/10/16	05/25/16	2.5		
Silver	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Zinc	6020A	0.5	5.0	05/10/16	05/25/16	132		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1604486
Project No.:	160004158	**Date Collected:**	4/24/2016
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	4/28/2016
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **042416TRBDVJ9** **Lab Code:** **K1604486-011**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	05/10/16	05/25/16	0.5	U	
Cadmium	6020A	0.02	5.0	05/10/16	05/25/16	0.17		
Copper	6020A	0.1	5.0	05/10/16	05/25/16	2.4		
Lead	6020A	0.02	5.0	05/10/16	05/25/16	0.10		
Selenium	6020A	1.0	5.0	05/10/16	05/25/16	2.1		
Silver	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Zinc	6020A	0.5	5.0	05/10/16	05/25/16	115		

Comments:

Metals

- 1 -

INORGANIC ANALYSIS DATA PACKAGE

Client:	Alaska Department of Fish and Ga	**Service Request:**	K1604486
Project No.:	160004158	**Date Collected:**	
Project Name:	Tulsequah Chief Mine Water Quali	**Date Received:**	
Matrix:	TISSUE	**Units:**	mg/Kg
		Basis:	DRY

Sample Name: **Method Blank** **Lab Code:** **KQ1604632-01**

Analyte	Analysis Method	MRL	Dilution Factor	Date Extracted	Date Analyzed	Result	C	Q
Arsenic	6020A	0.5	5.0	05/10/16	05/25/16	0.5	U	
Cadmium	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Copper	6020A	0.1	5.0	05/10/16	05/25/16	0.1	U	
Lead	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Selenium	6020A	1.0	5.0	05/10/16	05/25/16	1.0	U	
Silver	6020A	0.02	5.0	05/10/16	05/25/16	0.02	U	
Zinc	6020A	0.5	5.0	05/10/16	05/25/16	0.5	U	

Comments:

Metals
- 5A -
SPIKE SAMPLE RECOVERY

Client: Alaska Department of Fish and Ga **Service Request:** K1604486

Project No.: 160004158 **Units:** MG/KG

Project Name: Tulsequah Chief Mine Water Quali **Basis:** DRY

Matrix: TISSUE

Sample Name: 042416TRBDVJ2S **Lab Code:** K1604486-004S

Analyte	Control Limit %R	Spike Result	C	Sample Result	C	Spike Added	%R	Q	Method
Arsenic	75 - 125	25.3		0.5	U	24.0	105		6020A
Cadmium	75 - 125	4.79		0.06		4.81	98		6020A
Copper	75 - 125	24.7		2.3		24.0	93		6020A
Lead	75 - 125	44.60		0.02	U	48.08	93		6020A
Selenium	75 - 125	29.7		3.9		24.0	108		6020A
Silver	75 - 125	4.45		0.02	U	4.81	93		6020A
Zinc	75 - 125	167		120		48.1	98		6020A

An empty field in the Control Limit column indicates the control limit is not applicable

Metals

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DUPLICATES

Client: Alaska Department of Fish and Ga **Service Request:** K1604486

Project No.: 160004158 **Units:** MG/KG

Project Name: Tulsequah Chief Mine Water Quali **Basis:** DRY

Matrix: TISSUE

Sample Name: 042416TRBDVJ2D **Lab Code:** K1604486-004D

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	Method
Arsenic		0.5	U	0.5	U			6020A
Cadmium		0.06		0.06		0.0		6020A
Copper	20	2.3		2.3		0.0		6020A
Lead		0.02	U	0.02		200.0		6020A
Selenium		3.9		4.1		5.0		6020A
Silver		0.02	U	0.02	U			6020A
Zinc	20	120		118		1.7		6020A

An empty field in the Control Limit column indicates the control limit is not applicable.

Metals

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LABORATORY CONTROL SAMPLE

Client: Alaska Department of Fish and Ga **Service Request:** K1604486

Project No.: 160004158

Project Name: Tulsequah Chief Mine Water Quali

Aqueous LCS Source: ALS MIXED **Solid LCS Source:**

Analyte	Aqueous (ug/L) True	Aqueous (ug/L) Found	Aqueous (ug/L) %R	Solid (mg/kg) True	Solid (mg/kg) Found	Solid (mg/kg) C	Solid (mg/kg) Limits	Solid (mg/kg) %R
Arsenic	250.0	238.0	95					
Cadmium	50.0	47.3	95					
Copper	250.0	238.8	96					
Lead	500.0	459.5	92					
Selenium	250.0	242.2	97					
Silver	50.0	47.6	95					
Zinc	500.0	484.8	97					

ALS Group USA, Corp.
dba ALS Environmental
QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1604486
Project:	Tulsequah Chief Mine Water Qaulity & Aquatic Studies/160004158	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	05/10/16
		Date Analyzed:	05/25/16

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1604486-SRM1	Basis:	Dry
Test Notes:	Dorm-4 Solids = 94.5%		

Source: N.R.C.C. Dorm-4

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	6020A	6.8	7.0	103	4.93-8.93	
Cadmium	PSEP Tissue	6020A	0.306	0.311	102	0.233 - 0.385	
Copper	PSEP Tissue	6020A	15.9	15.6	98	12.0 - 20.2	
Lead	PSEP Tissue	6020A	0.416	0.328	79	0.290 - 0.563	
Selenium	PSEP Tissue	6020A	3.56	4.08	115	2.58 - 4.68	
Zinc	PSEP Tissue	6020A	52.20	54.8	105	39.2 - 66.5	

ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	Alaska Department of Fish and Game	**Service Request:**	K1604486
Project:	Tulsequah Chief Mine Water Qaulity & Aquatic Studies/160004158	**Date Collected:**	NA
LCS Matrix:	Tissue	**Date Received:**	NA
		Date Extracted:	05/10/16
		Date Analyzed:	05/25/16

Standard Reference Material Summary
Total Metals

Sample Name:	Standard Reference Material	Units:	mg/Kg (ppm)
Lab Code:	K1604486-SRM2	Basis:	Dry
Test Notes:	Tort-3 Solids = 99.1%		

Source: N.R.C.C. Tort-3

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	Control Limits	Result Notes
Arsenic	PSEP Tissue	6020A	59.5	67.9	114	44.6-76.0	
Cadmium	PSEP Tissue	6020A	42.3	41.0	97	32.4-52.9	
Copper	PSEP Tissue	6020A	497	450	91	380-623	
Lead	PSEP Tissue	6020A	0.225	0.190	84	0.166-0.292	
Selenium	PSEP Tissue	7742	10.9	11.8	108	7.9-14.3	
Zinc	PSEP Tissue	6020A	136	137	101	104-170	